CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

CONFIDENTIAL PRESENTATION

Ted Nelson's Zigzag™ and Ted Nelson's Dimensia™

March 24, 1994

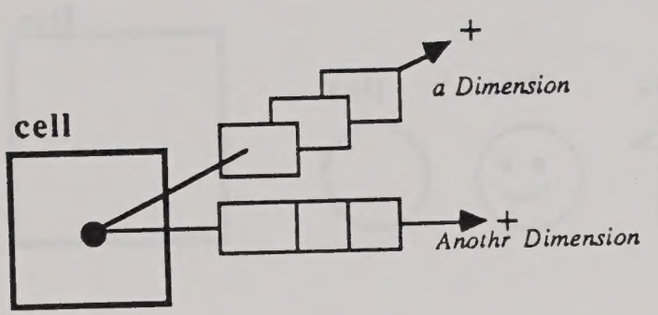
ZZ Picbuf4 94q1 d3
94.3.4 page 1

CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

Paradoxical Discrete Hyperspace

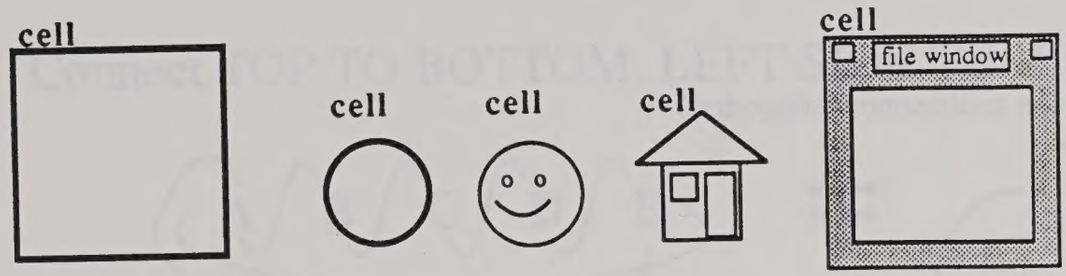
Paradoxical Discrete Hyperspace

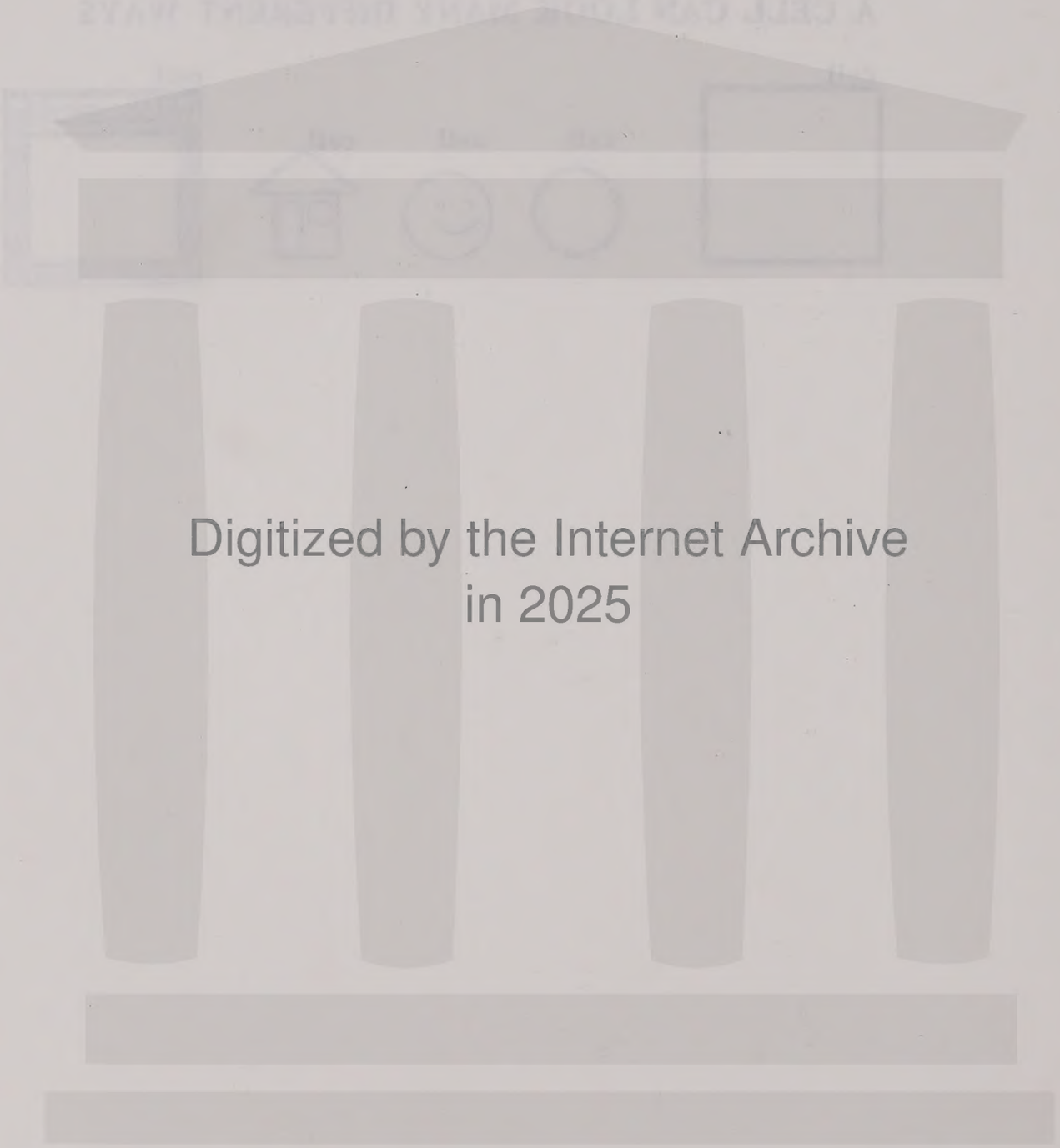
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #29
SAUSALITO, CA 9496



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

A CELL CAN LOOK MANY DIFFERENT WAYS





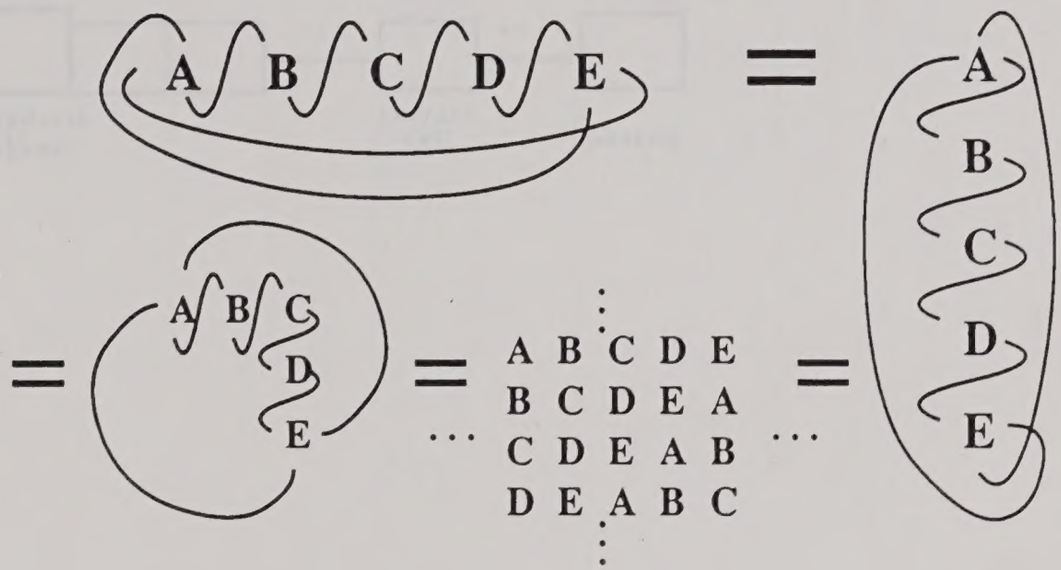
Digitized by the Internet Archive
in 2025

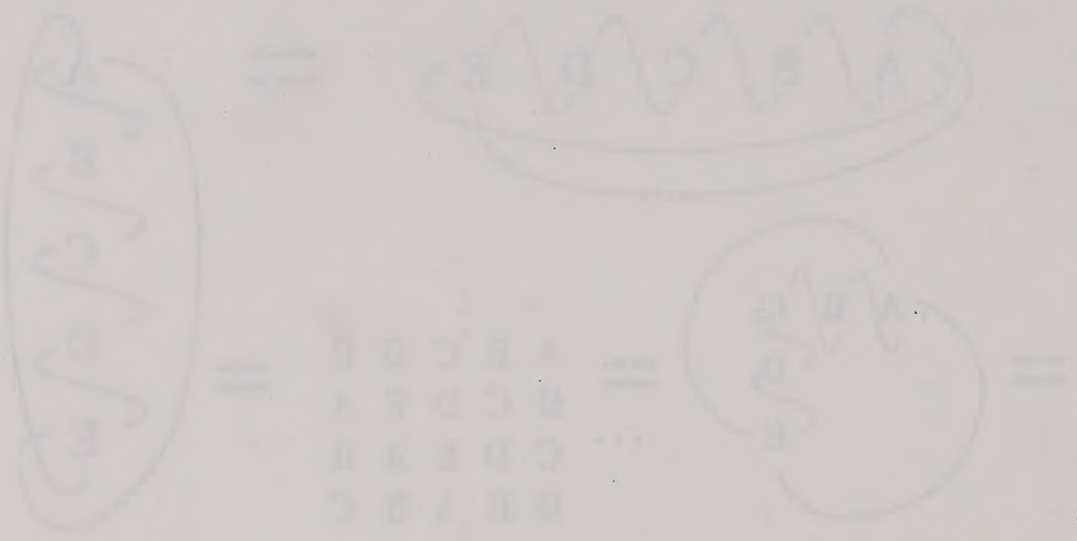
https://archive.org/details/confidentialpres00tedn

CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 9496

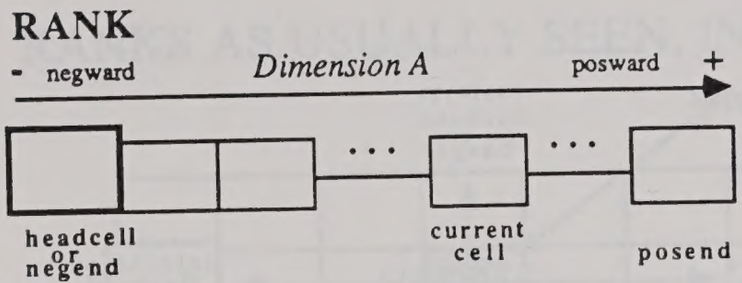
Connect TOP TO BOTTOM, LEFT SIDE TO RIGHT

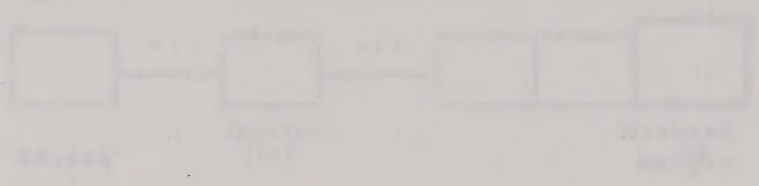
(orthogonal connections not shown)





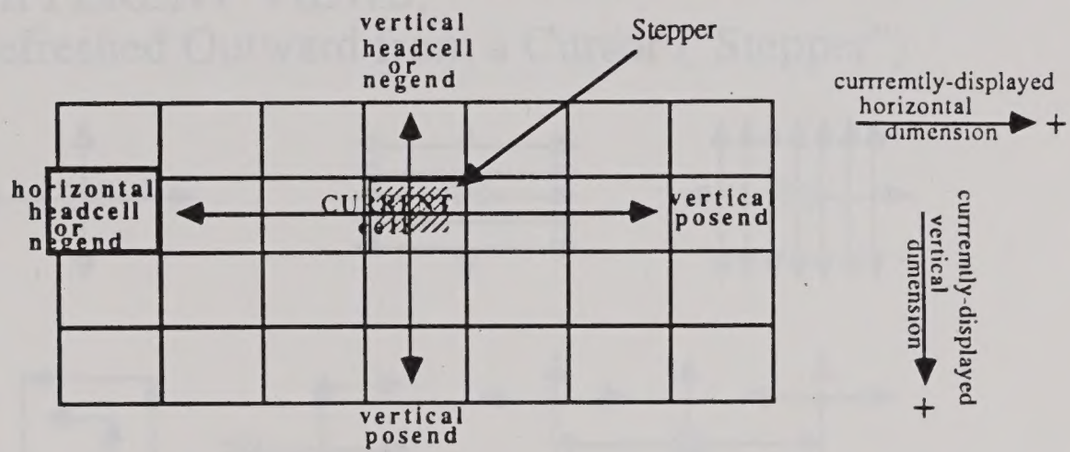
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965





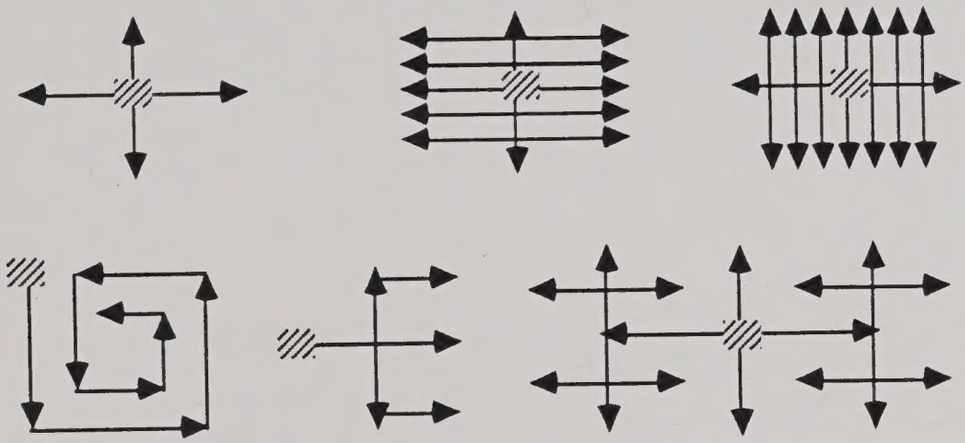
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

RANKS AS USUALLY SEEN, IN A GRID

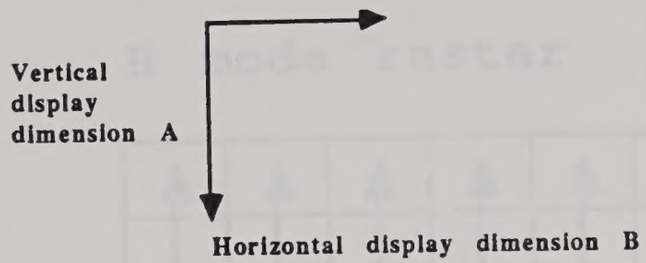


CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #2
SAUSALITO, CA 949

DIFFERENT VIEWS,
Refreshed Outward from a Cursor ("Stepper")



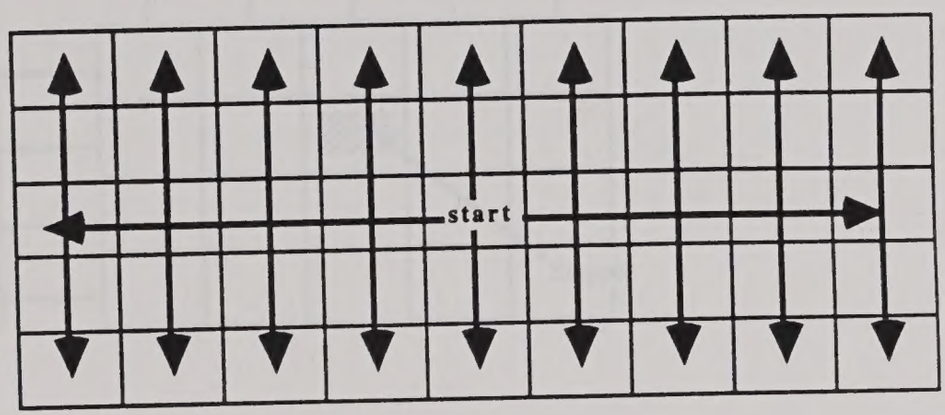
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #2
SAUSALITO, CA 949



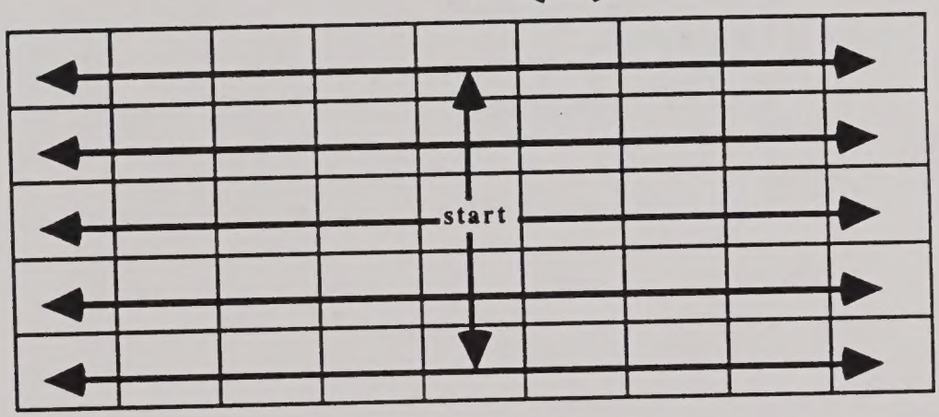
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

THE TWO MAIN REFRESH RASTERS

H mode raster

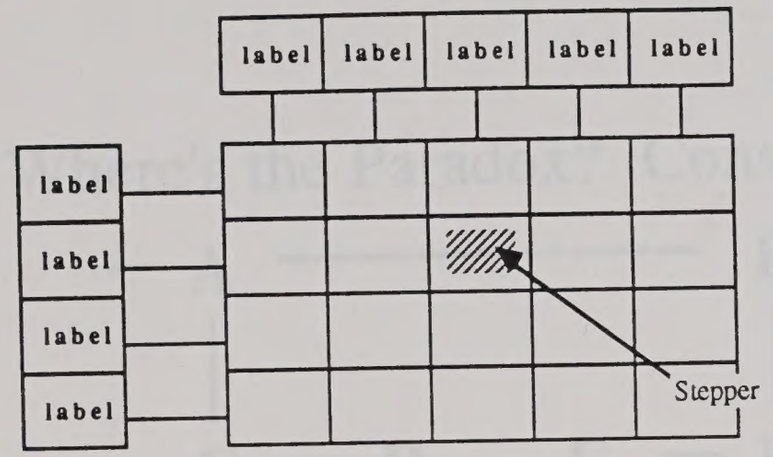


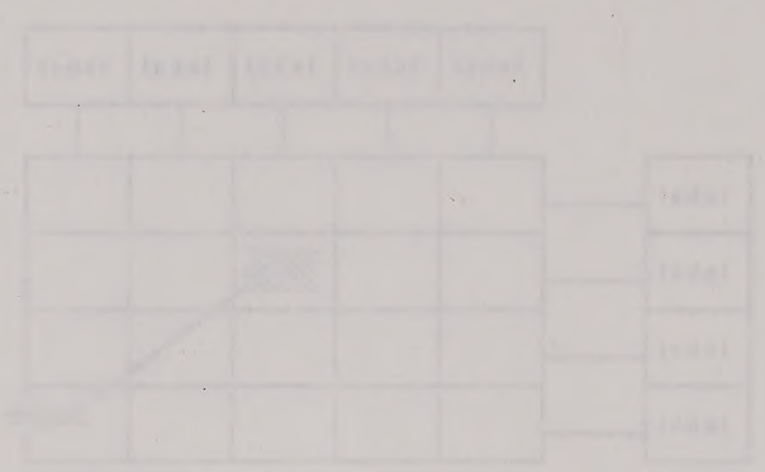
I mode raster



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

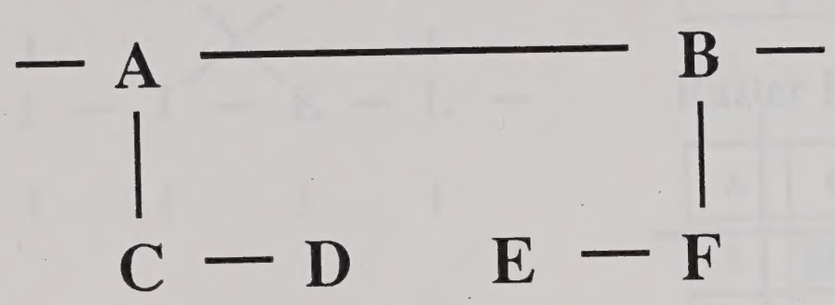
FLOATING-HEADCELL RASTER



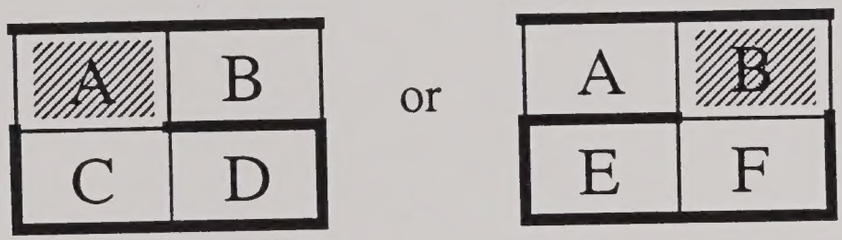


CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Where's the Paradox? Consider:



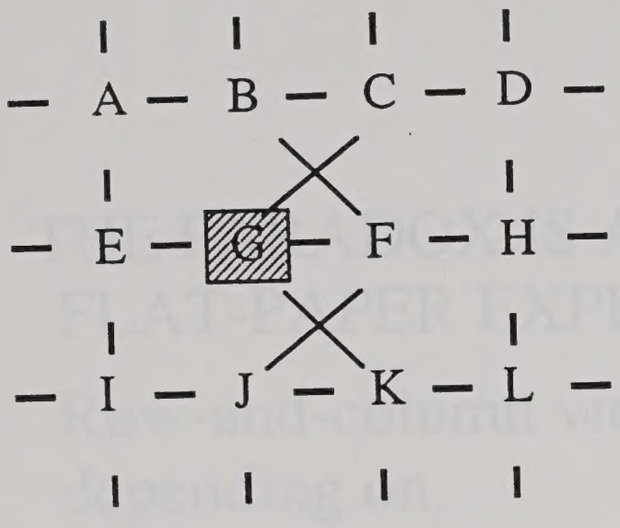
Shows (depending on Stepper) as:



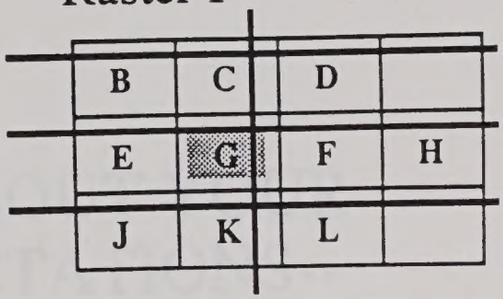
C
D
B
E
F
V

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

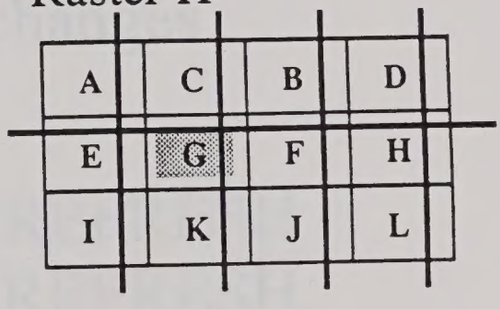
THE VIEW FROM THE STEPPER



Raster I



Raster H



CONFIDENTIAL

TED NELSON
3020 BRIDGEWAY #29
SAUSALITO, CA 94965

THE PARADOX IS ABOUT YOUR FLAT-PAPER EXPECTATIONS--

Row-and-column view changes depending on

CENTER OF REFRESH
RASTER OF REFRESH.

CONFIDENTIAL

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

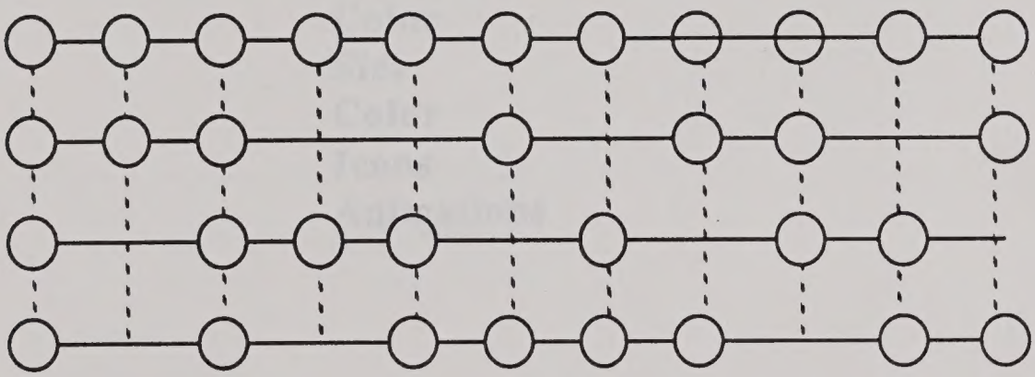
WYSIWYG usually means

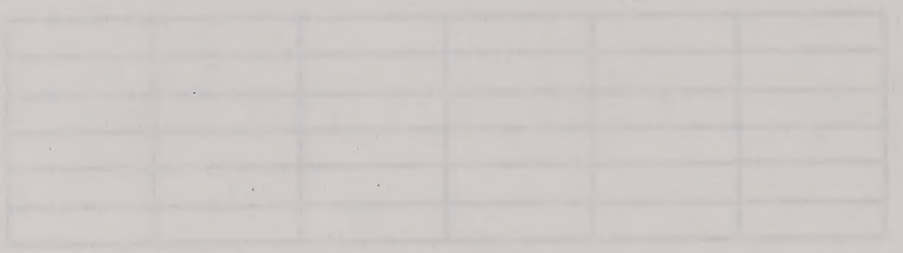
USE THE COMPUTER as a PAPER SIMULATOR!

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Viewing in Row-and-Column Format

MAKES IRREGULARITIES LIE DOWN TOGETHER.





CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Visual cues to help in grid--

Unconnected
Connected but Not Shown
Connected to other shown cell

Edge highlighting

Pips and Marks
Color
Size
Color
Icons
Animations

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

VIEWFLIPS
(all just change the view)

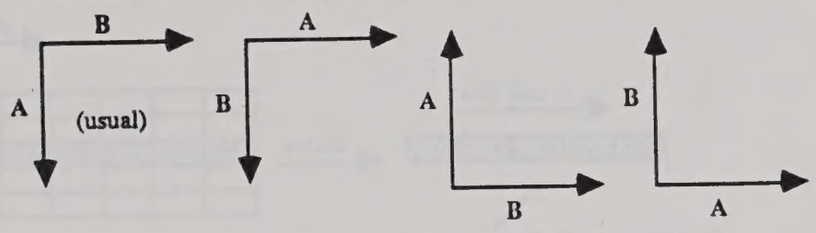
FLIP RASTER	EXCHANGE COORDINATES
FLIP CELLVIEW	REVERSE COORDINATE
HOP STEPPER	SPIN DIMENSION

NAIL Stepper Position	RELEASE Stepper Position
Keep Showing Inactive Stepper	

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

ROTEN FLIPS

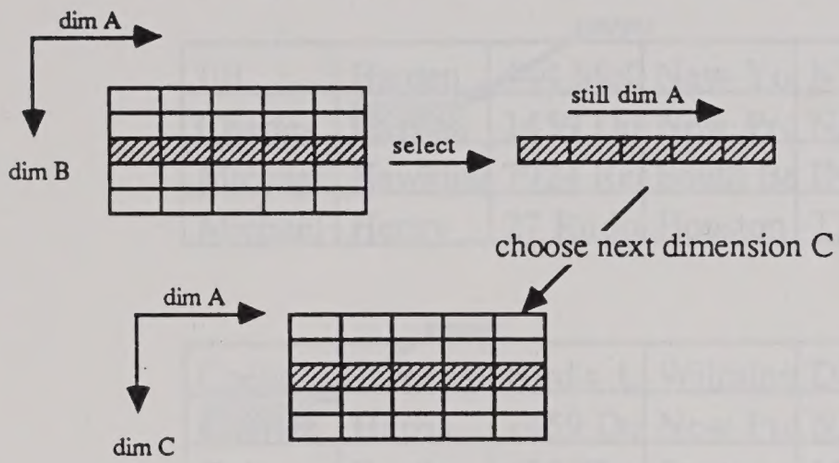
~~DIMENSIONAL FLIPS--~~ Some of the Variations



19

CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

ROTATION: Pick a Rank, New Dimension Comes In



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

SIMPLE DATABASE BY STEPPER
(H Raster)

stepper

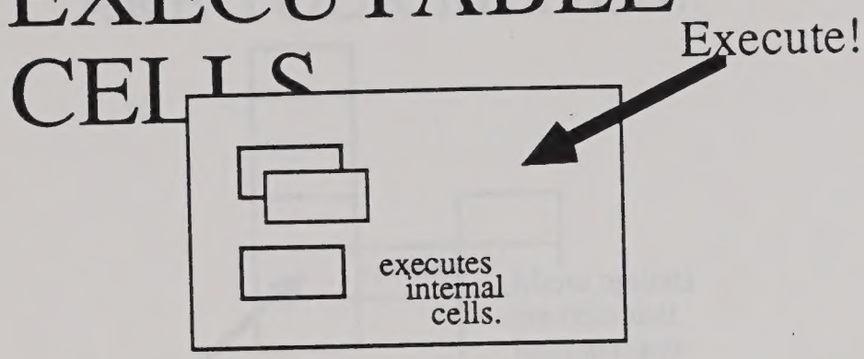
Jill	Hansen	444 McC	New Yo	NY	19081
Charles	Harris	1459 Du	New Pro	NJ	99404-6
Michael	Hawking	7924 Re	South Be	IN	82056
Michael	Henry	27 Rudo	Houston	TX	44029

stepper

Ceelia	Tweedal	Bird's L	Wilming	DE	88876
Charles	Harris	1459 Du	New Pro	NJ	99404-6
Colton	Rantles	555 The	Boston	MA	08568
Culpepp	Zsigmon	666 Ruft	Denver	CO	56565

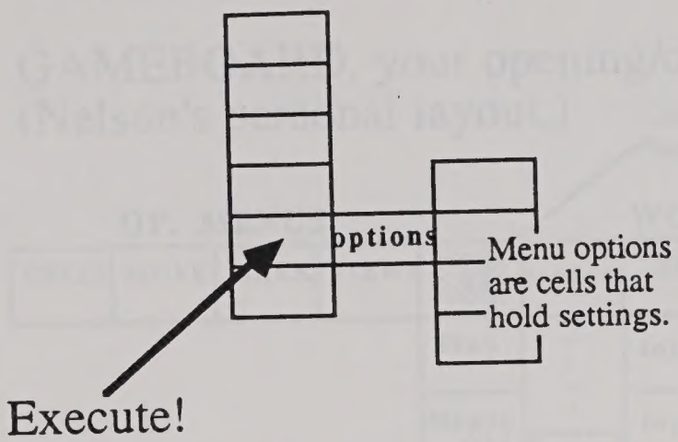
CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #296
SAUSALITO, CA 94965

EXECUTABLE CELLS



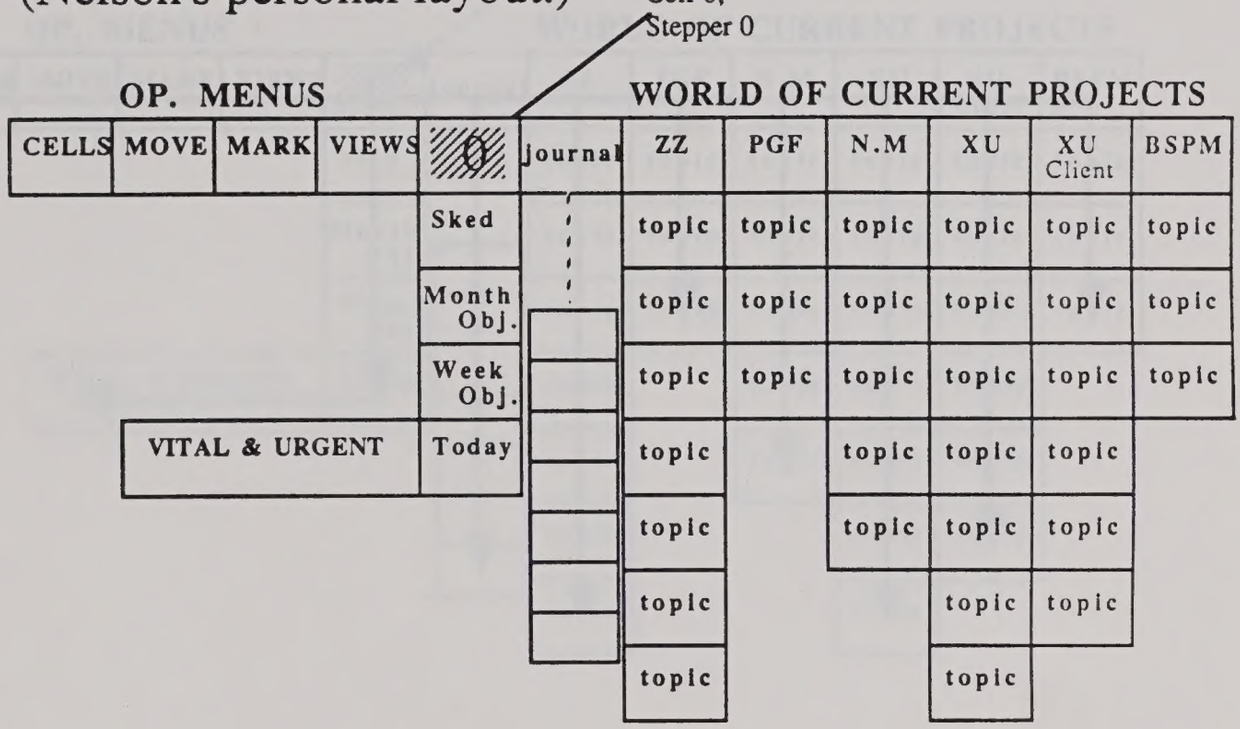
CONFIDENTIAL 22
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

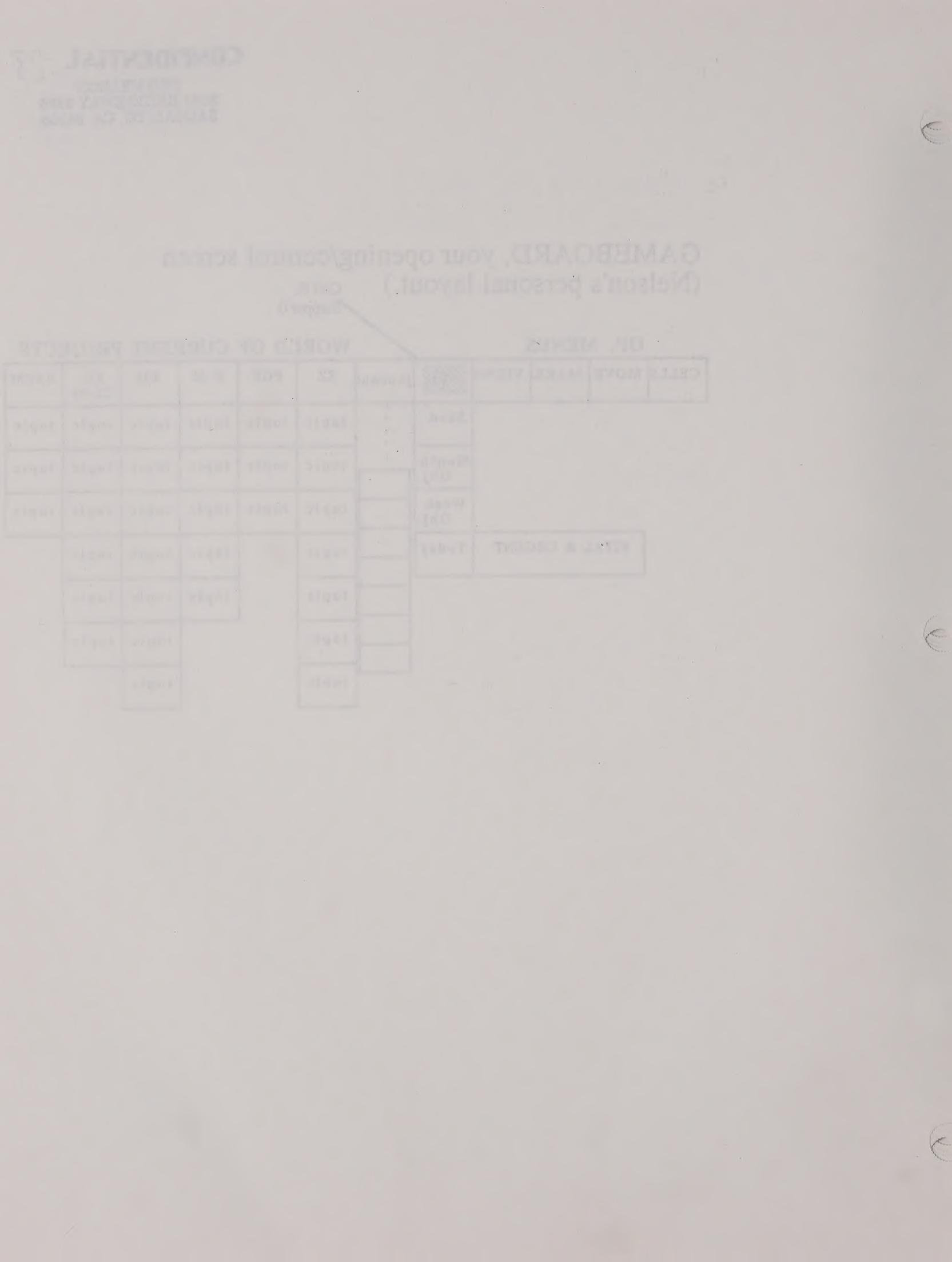
EXECUTABLE CELLS
ARE YOUR MENUS.



CONFIDENTIAL 23
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

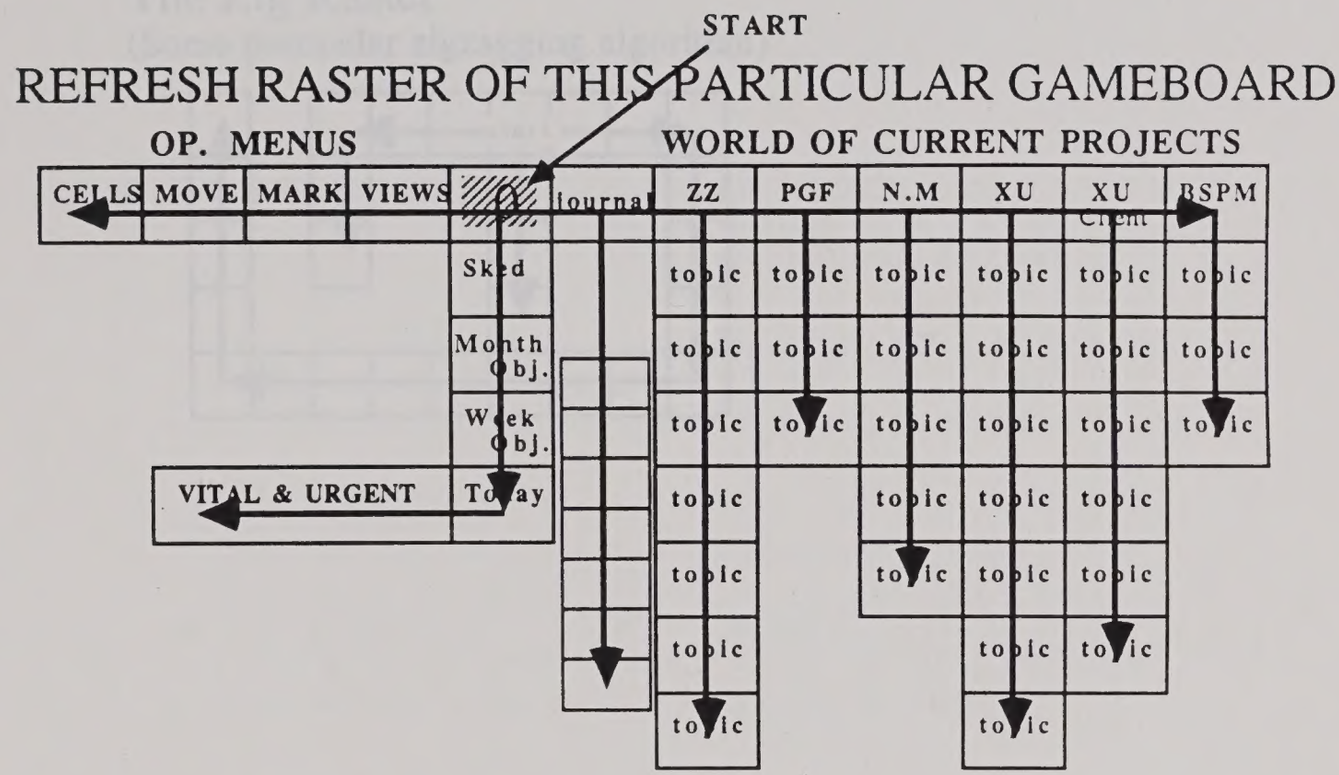
GAMEBOARD, your opening/control screen (Nelson's personal layout.)





CONFIDENTIAL 84

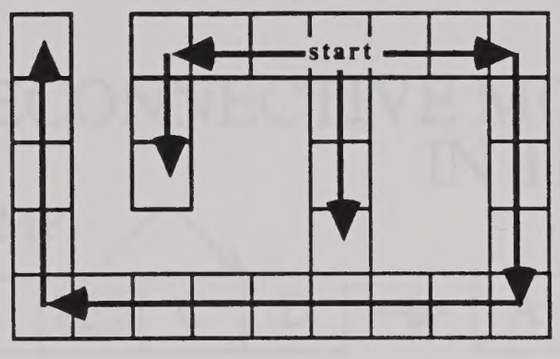
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

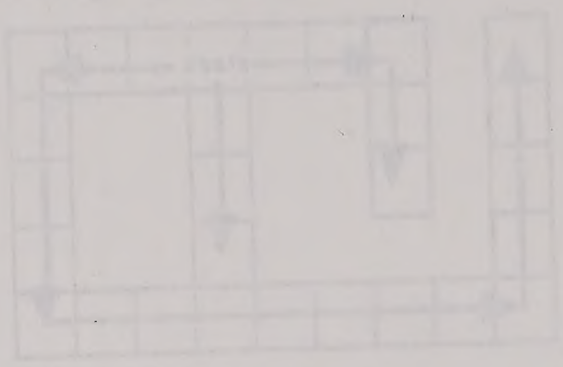


CONFIDENTIAL 25
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

The Zig Raster

(Some particular zigzagging algorithm)

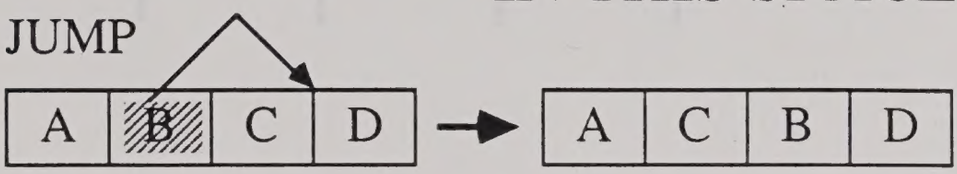




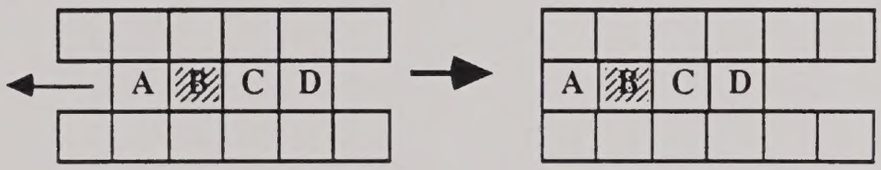
CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

RECONNECTIVE MOVES IN THIS SPACE

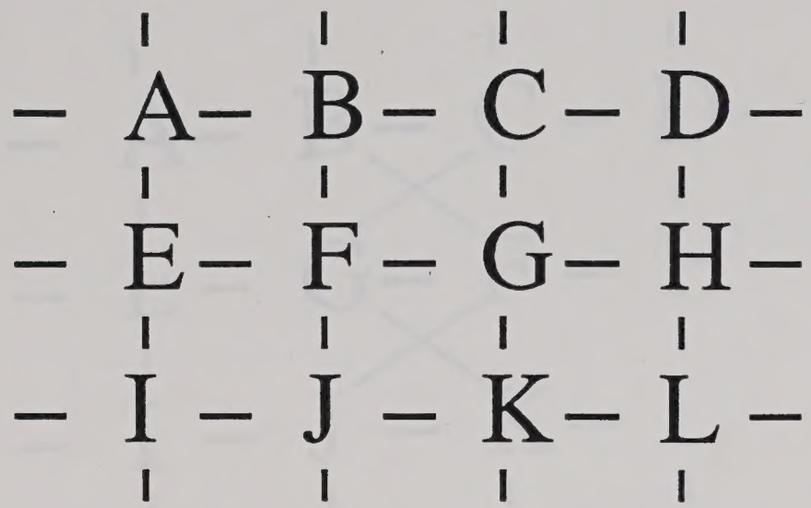
JUMP

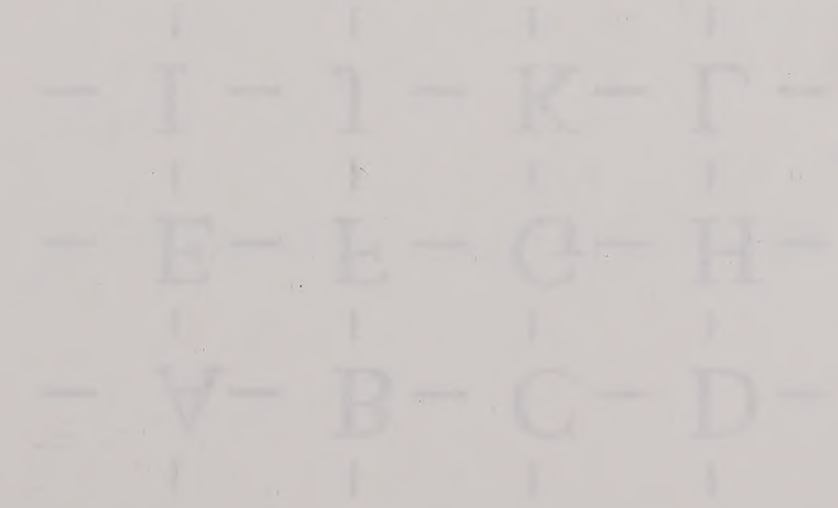


SLIDE or SHEAR



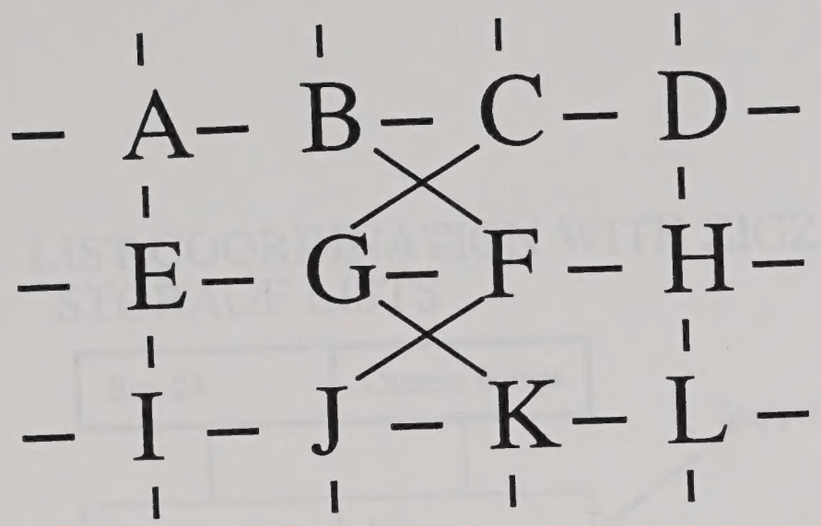
CONFIDENTIAL 27
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

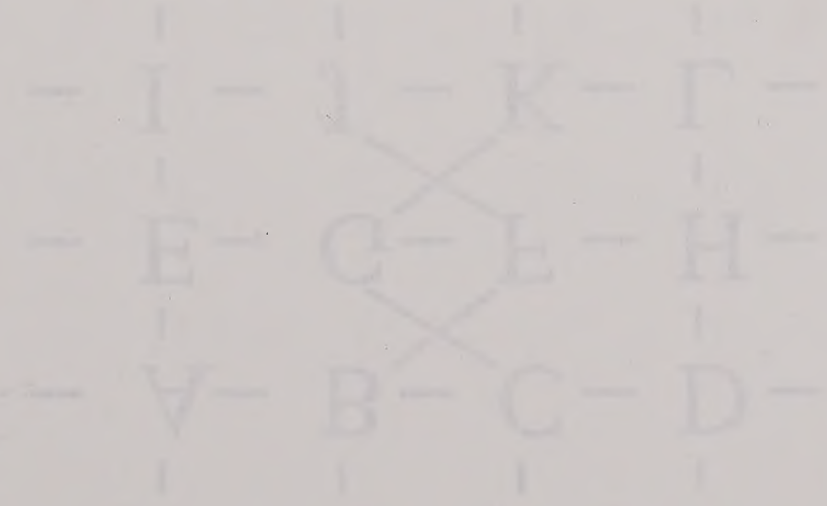



I
J
K
Γ
E
L
G
H
V
B
C
D

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

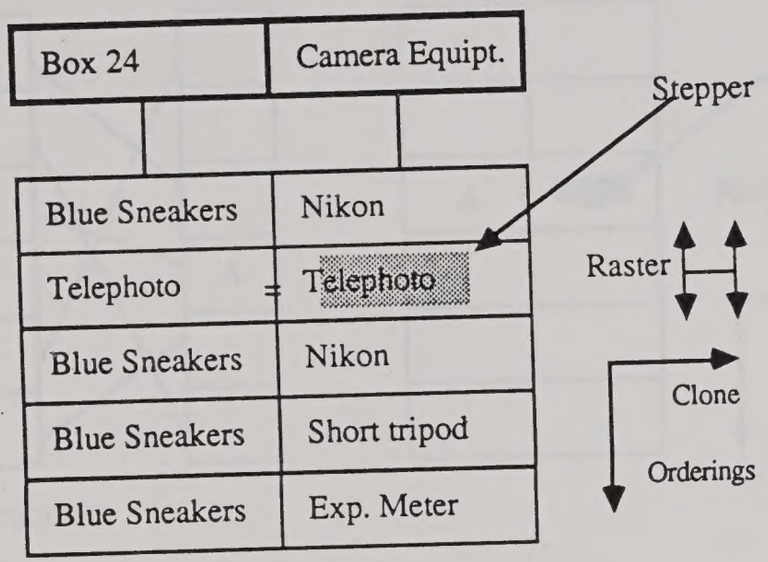
28




I
K
Γ
E
C
L
H
A
B
C
D

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

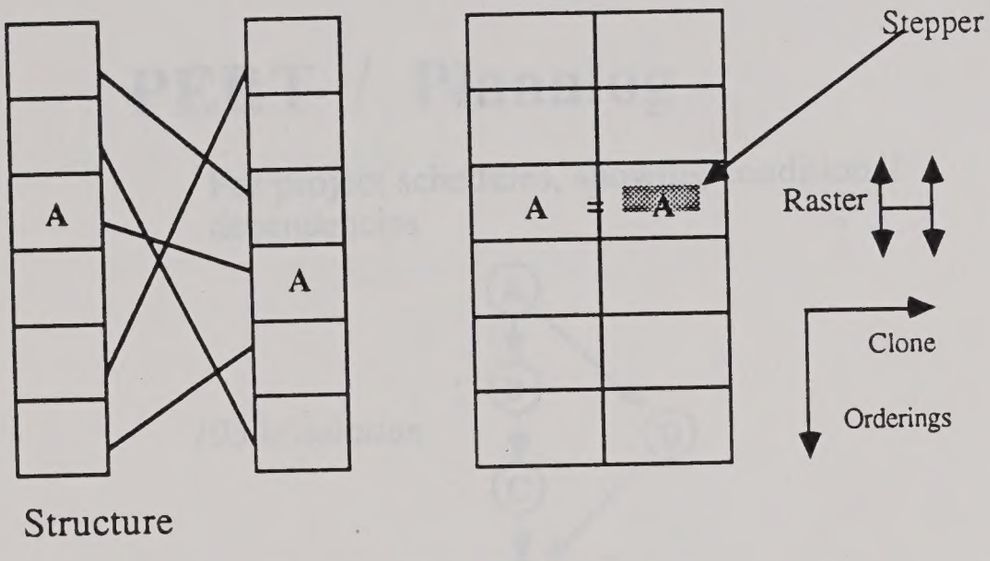
LIST COORDINATION WITH ZIGZAG: STORAGE LISTS



CONFIDENTIAL
TED NELSON
BRIDGEWAY #295
USALITO, CA 94965

30

SEEING TWO DIFFERENT ORDERINGS AT THE SAME TIME



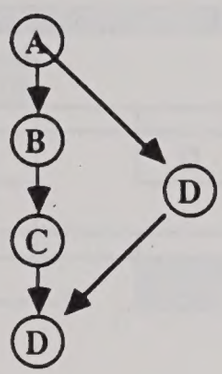
Structure

CONFIDENTIAL
ED NELSON
RIDGEWAY #295
SALITO, CA 94965

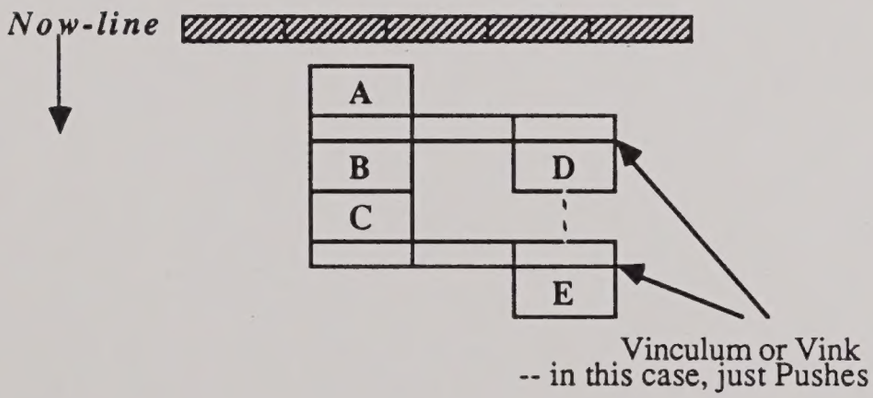
PERT / Planalog

For project schedules, showing conditional dependencies

1950s notation



As physically implemented with blocks in the 1960s "Planalog," and implemented in ZigZag

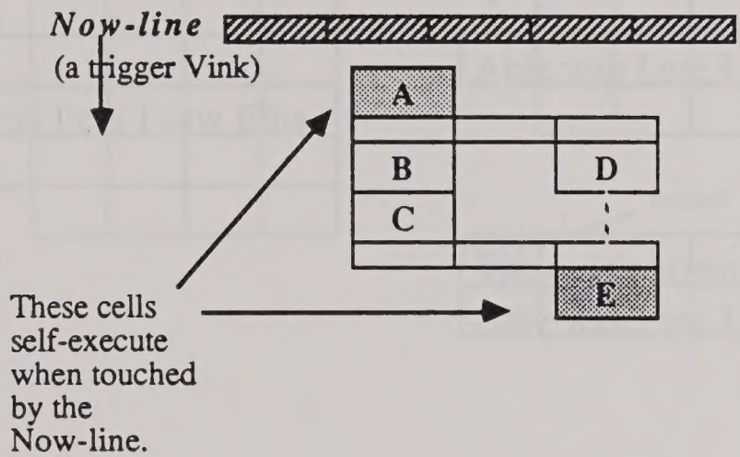


Vinculum or Vink
-- in this case, just Pushes

A
B
C
D
E

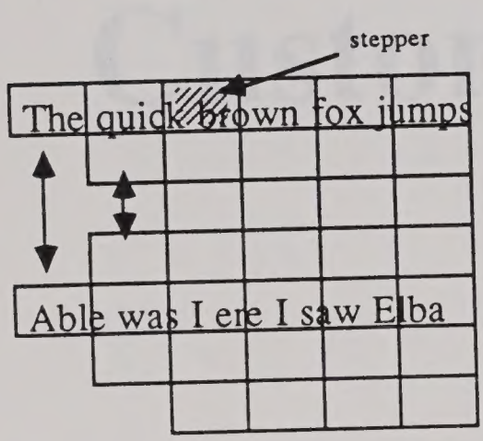
ZZ Pichuf4 94q1 d3
CONFIDENTIAL
NELSON
RIDGEWAY #295
SAUSALITO, CA 94965
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

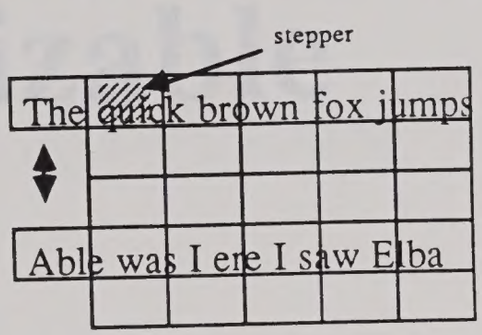
PROGRAMMING with PERT model

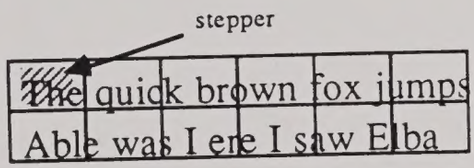


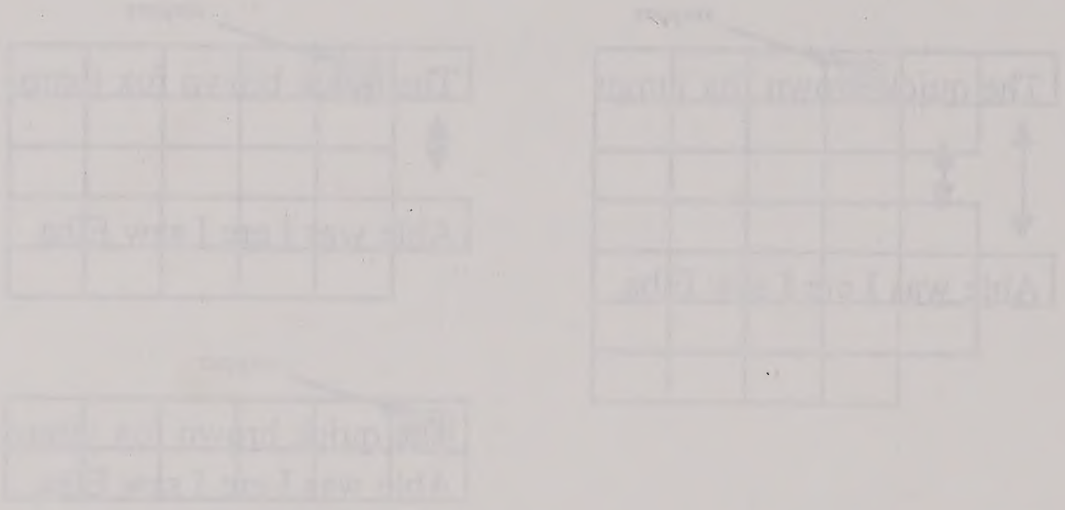
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

OUTLINING:
Indentation simply determined by Stepper









34

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

User-Extensible, User-Customizable

User-Extensible, User-Customizable

ZZ Picbuf4 94q1 d3
94.3.4 page
TED NELSON
[illegible]
SAUSALITO, CA 94965
CONFIDENTIAL
75

DEFAULT VISUALIZATIONS FOR EVERYTHING

DEFAULT VISUALIZATIONS FOR EVERYTHING

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #A
SAUSALITO, CA 94965

COMPRESSION

NO EMPTY CELLS

(unless for connective functions)

EVERYTHING IS ADJACENT OR NEAR

(Even if you need to add another dimension to bring it close)

A 37

CONFIDENTIAL

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

NEAR PAYOFFS

COMPLEX INTERCONNECTIVITY A SNAP with BUILT-IN VISUALIZATION

Surprise ease of Database Exploration

Surprise ease of Outlining

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

FAR PAYOFFS

Deep Interconnection among Complex Objects

A Better User Environment

Programmable at 1-2-3 Level

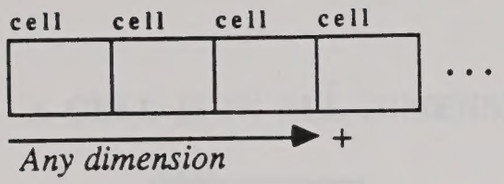
DEEPLY INTEGRATED "APPLICATIONS"

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Then generalize to N-Space.

Then generalize to
N-Space.

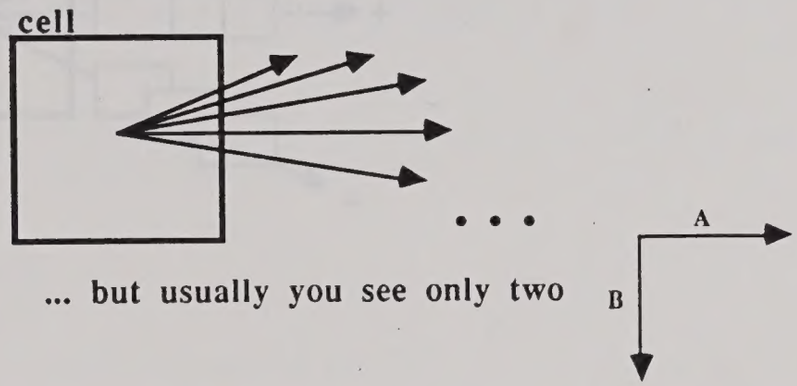
YO
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #29
SAUSALITO, CA 9496



41 56

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #2
SAUSALITO, CA 949

A CELL IS IN ALL DIMENSIONS AT ONCE

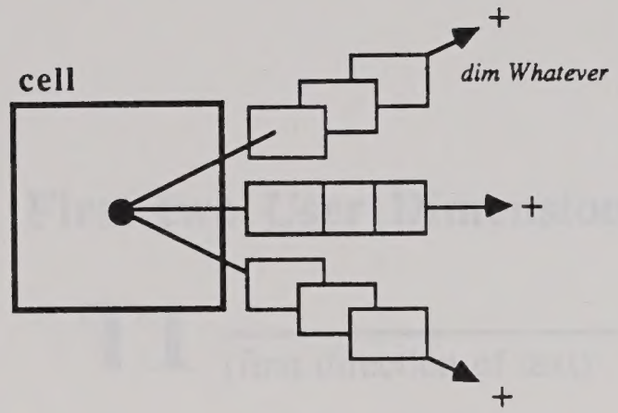


... but usually you see only two

42

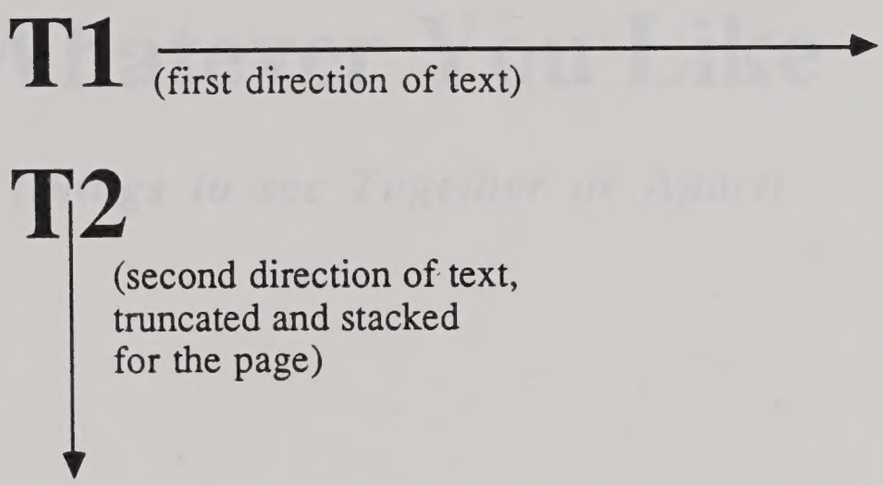
CONFIDENTIAL

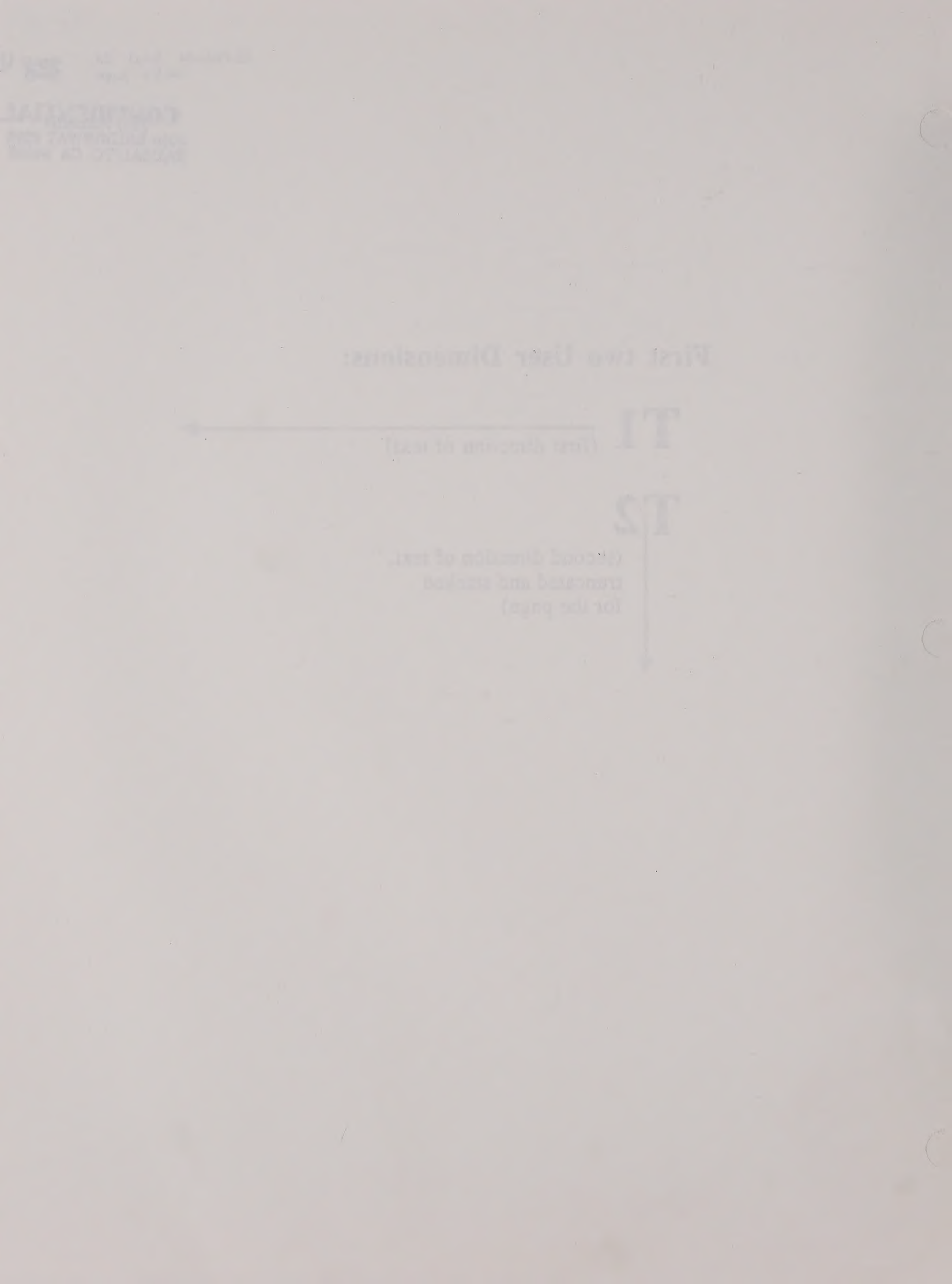
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

First two User Dimensions:





ZZ Picbuf4 94q1 d3
94.3.4 page
44
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

OTHER DIMENSIONS:

Whatever You Like

(things to see Together or Apart)

CONFIDENTIAL

TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

EVERY VIEW IS A ROTATION IN TEDSPACE

EVERY VIEW
IS A ROTATION
IN TEDSPACE

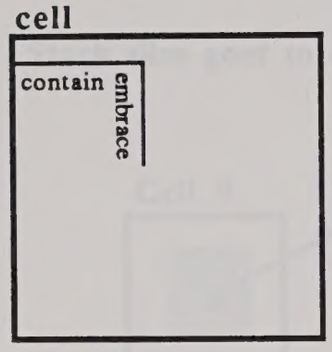
CONFIDENTIAL

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

SYSTEM DIMENSIONS

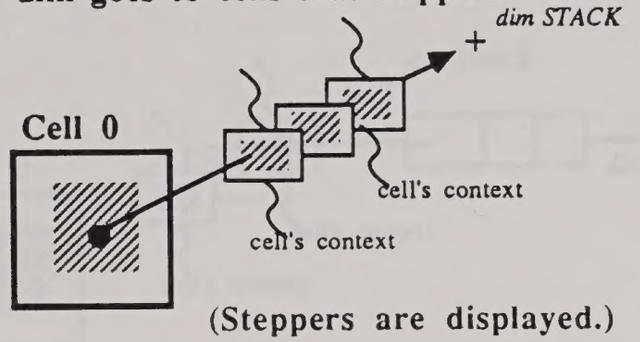
Date	Clone
Stepper	Multiclone
Contain	Subclone
Embrace	Metastepper
Stack	Disk Slice

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965



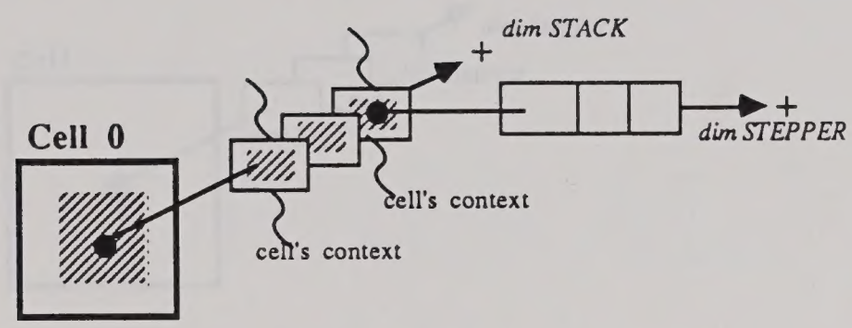
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

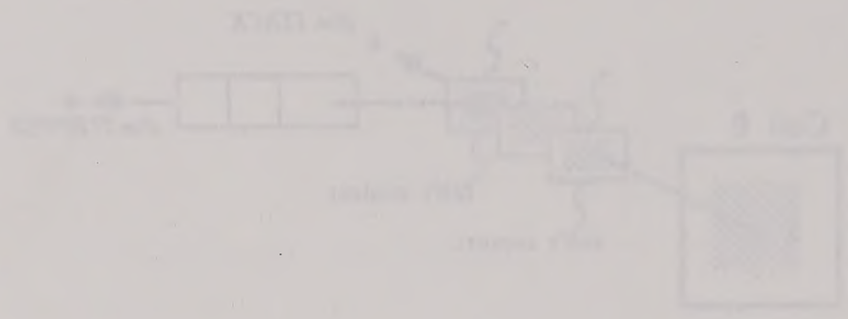
Stack dim goes to cells that steppers are on.



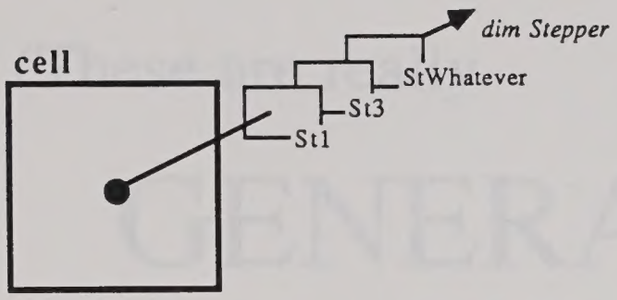
(Steppers are displayed.)

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965





CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965



GENERAL
GRAPH
STRUCTURES

-- left and right are conventions
to order the rows and columns.)

ZZ Picbuf4 94q1 d3
94.3.4 page 51
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

(These are really

GENERAL GRAPH STRUCTURES

-- left and right are conventions
to order the rows and columns.)

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

These are 1-to-1 UNTYPED CONNECTIONS

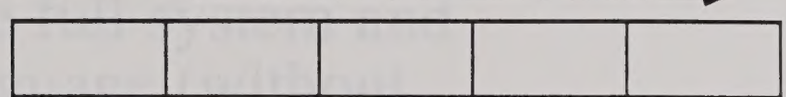
These are
1-to-1
UNTYPED
CONNECTIONS

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

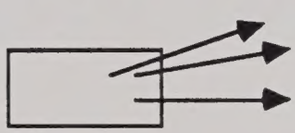
Typed Connections handled by:

CLONING

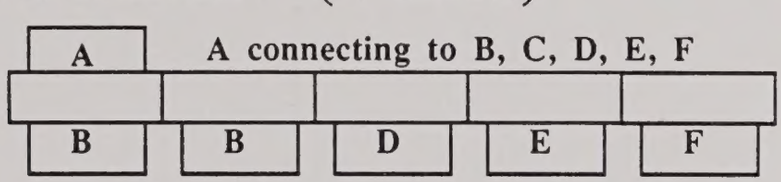
instances in Clone Dimension



OTHER DIMENSIONS



VINCULAE (Vinks)



ZZ Picbuf4 94q1 d3
94.3.4 page 54

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Ted Nelson's
Dimensia™

The full system and
language (without
application templates).

Ted Nelson's

Dimensia™

The full system and
language (without
application templates)

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Ted Nelson's Zigzag™

and

Ted Nelson's Dimensia™

CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

Ted Nelson's Zigzag™

The smaller,
introductory product
(undefined).

CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

MARKETS

Small Intro Product
(desk accessory?)

Major System, programmable

Portable Code for Other's Software

PDA!

LET OTHERS BUNDLE THE APPLICATIONS?

ZZ Picbuf4 94q1 d3
94.3.4 page 58
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

THIRD-PARTY OFFERINGS

Machine-Language Cells
(graphics, audio, video...)

C-Language Cells

Microcode

Application Templates

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

59

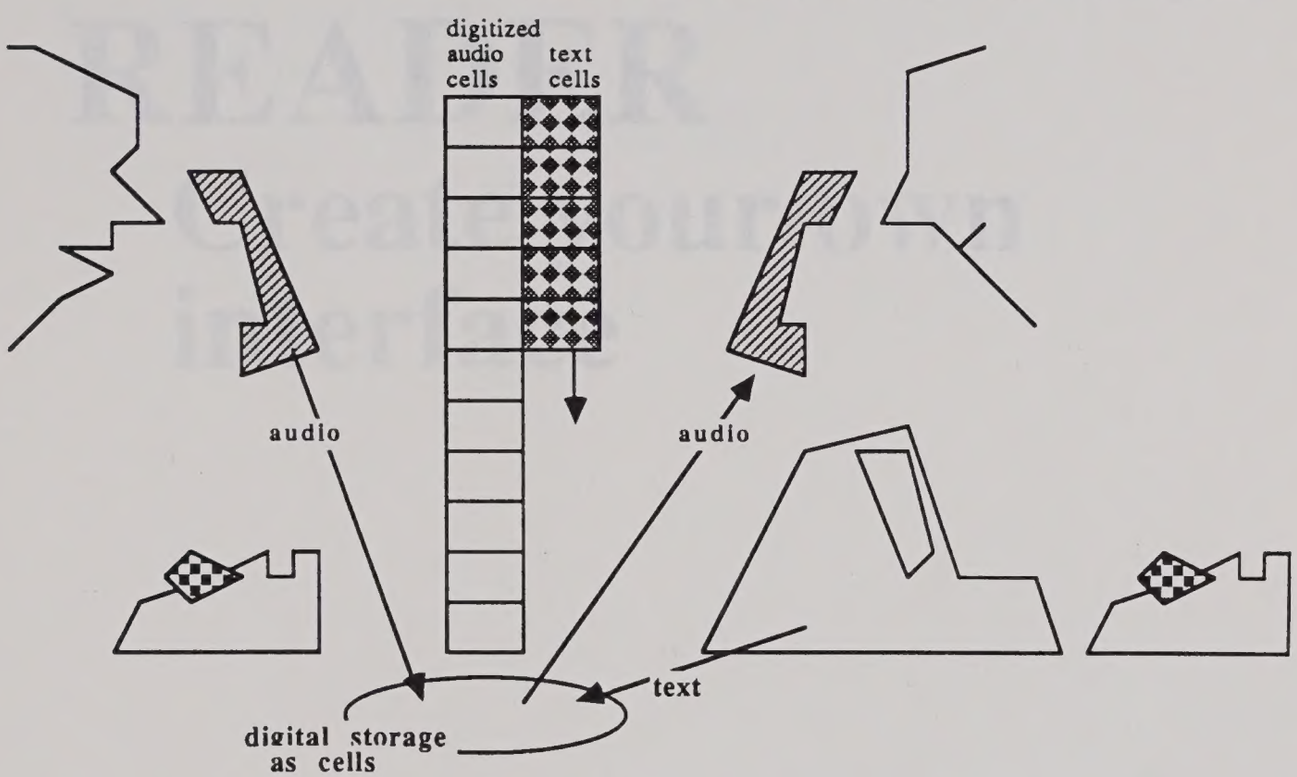
KILLER TEMPLATES

KILLER
TEMPLATES

CONFIDENTIAL 60
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

DICTATION INTO PHONE, Touch-Tone controls

TRANSCRIPTION FROM PHONE, Touch-Tone controls



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965
61

E-MAIL READER

Create your own interface

E-MAIL READER

Create your own interface

CONFIDENTIAL 62
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

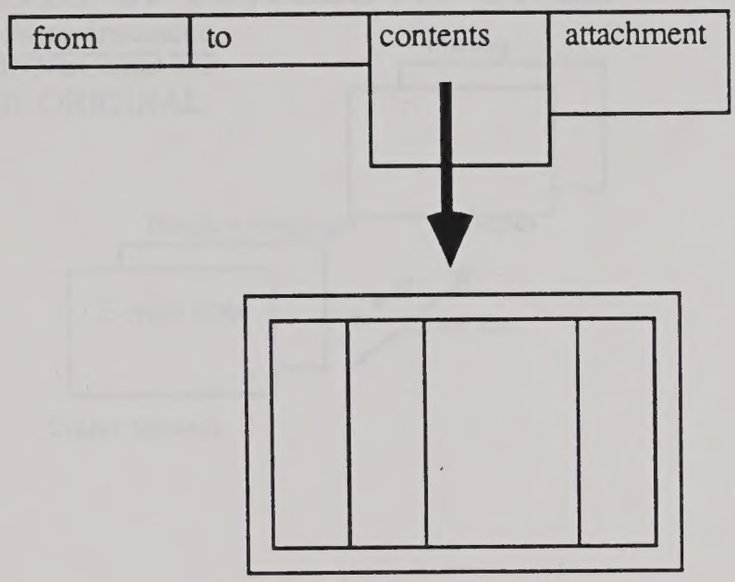
STORE E-MAIL IN ACCESSIBLE FORMAT

from	to	contents	attachment

CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

63

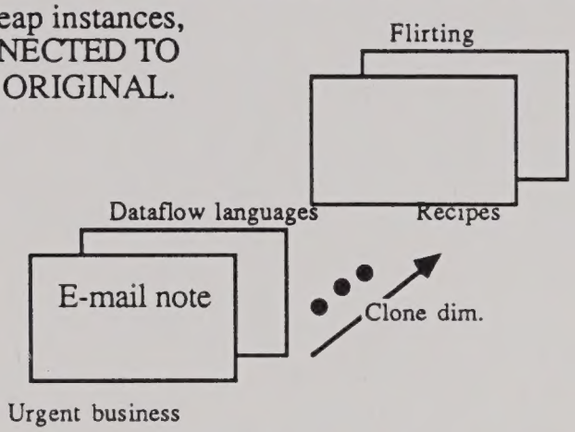
... ENCAPSULATED INTO ONE CELL



CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

FILE YOUR E-MAIL LOTS OF PLACES AT ONCE

as cheap instances, CONNECTED TO THE ORIGINAL.



CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

65

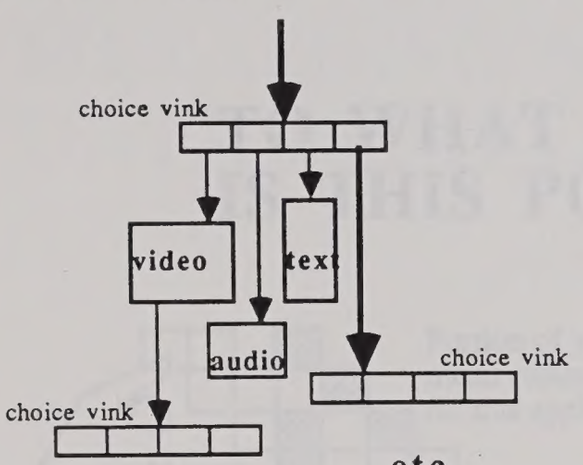
Multi/Hyper-Media System

Multi/Hyper-
Media System

TED NELSON
8020 BRIDGEWAY #296

66

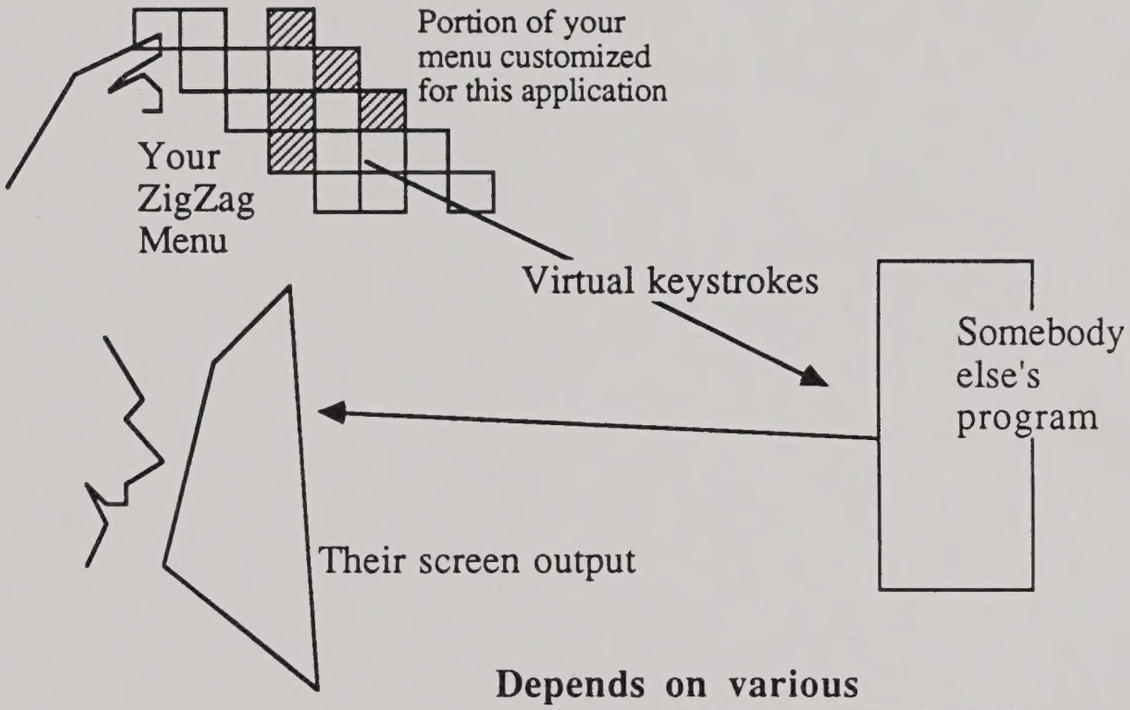
MULTIMEDIA AUTHORING AND USER SYSTEM



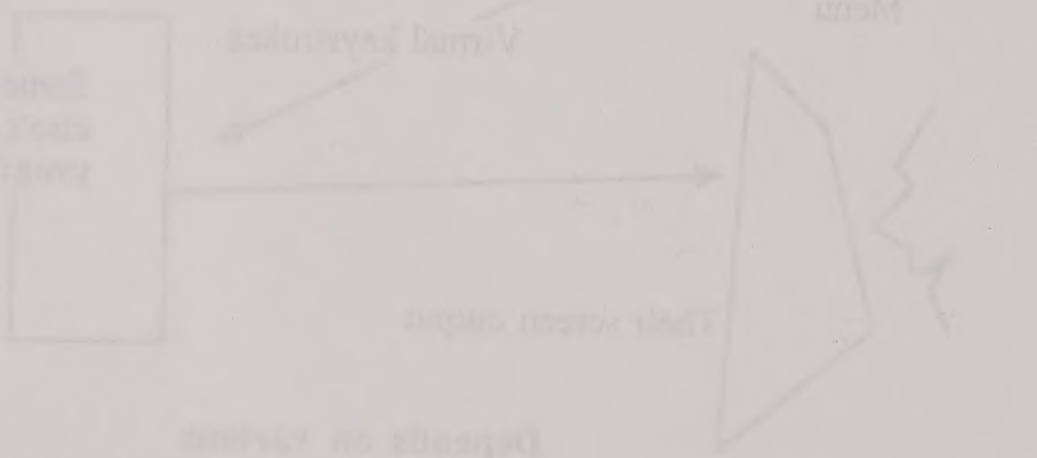
etc.

CONFIDENTIAL
TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

TO WHAT DEGREE IS THIS POSSIBLE?



Depends on various script-compliant technicalities of the foreign program, I guess.



CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

68

MULTIDIMENSIONAL DATA TEMPLATES

CONFIDENTIAL
DO NOT REMOVE FROM
RESEARCH LIBRARY

MULTIDIMENSIONAL DATA TEMPLATES

CONFIDENTIAL 69

TED NELSON
8020 BRIDGEWAY #295
SAUSALITO, CA 94965

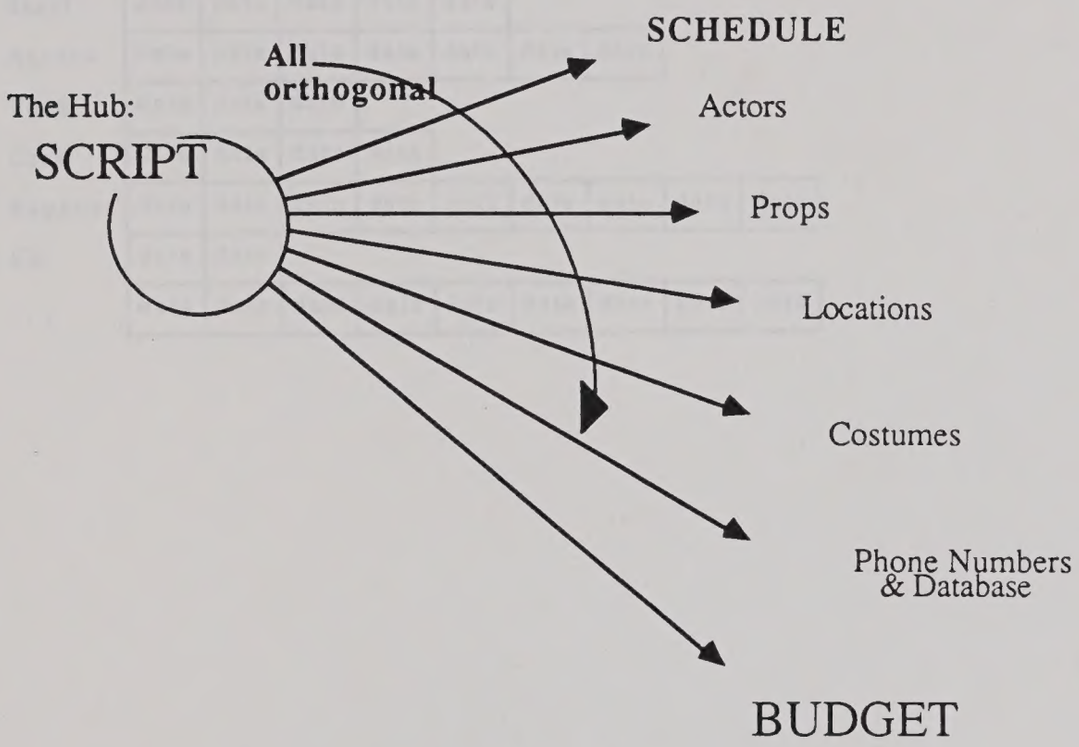
MOVIE PRODUCTION TEMPLATE

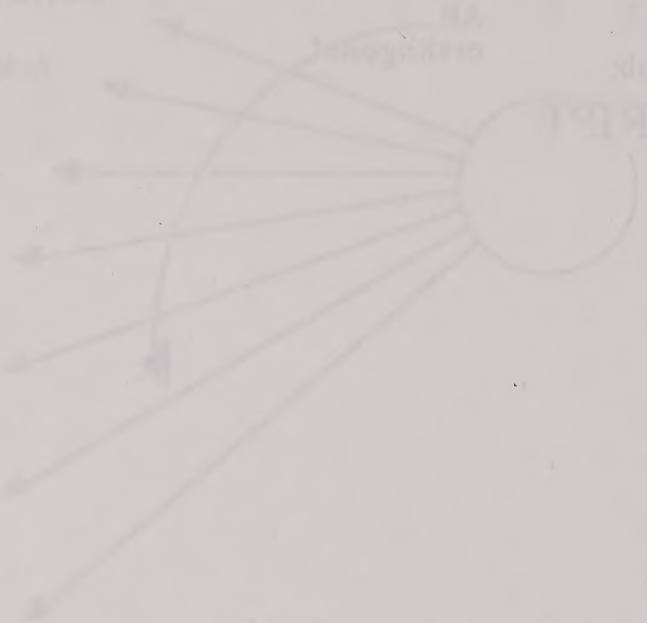
MOVIE PRODUCTION TEMPLATE

CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

70

MULTIDIMENSIONAL TEMPLATE for MOVIE PRODUCTION



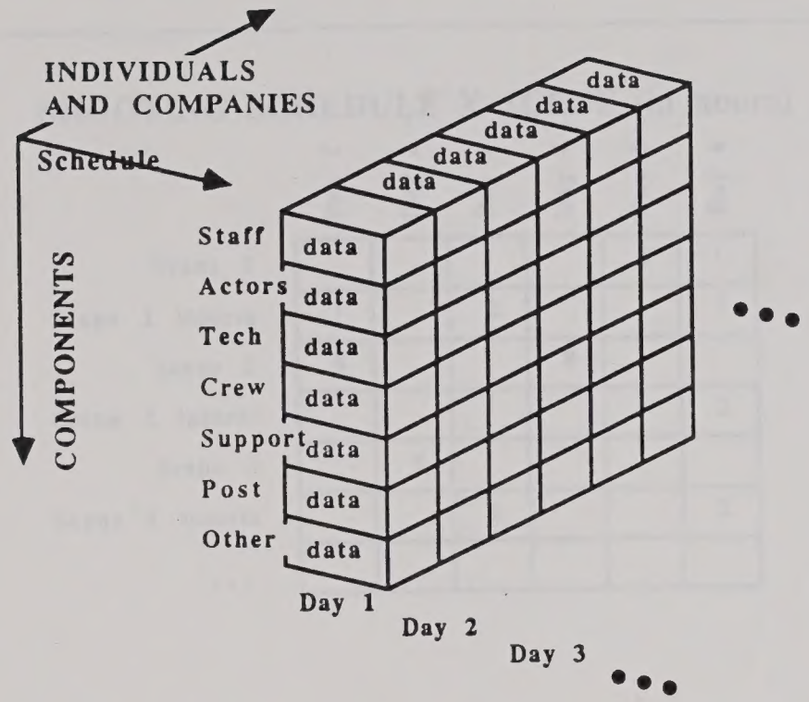


CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

INDIVIDUALS AND COMPANIES

Staff	data	data	data	data	data				
Actors	data	data	data	data	data	data	data		
Tech	data	data	data						
Crew	data	data	data	data					
Support	data	data	data	data	data	data	data	data	data
FX	data	data							
. . .	data	data	data	data	data	data	data	data	data

CONFIDENTIAL 72
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965



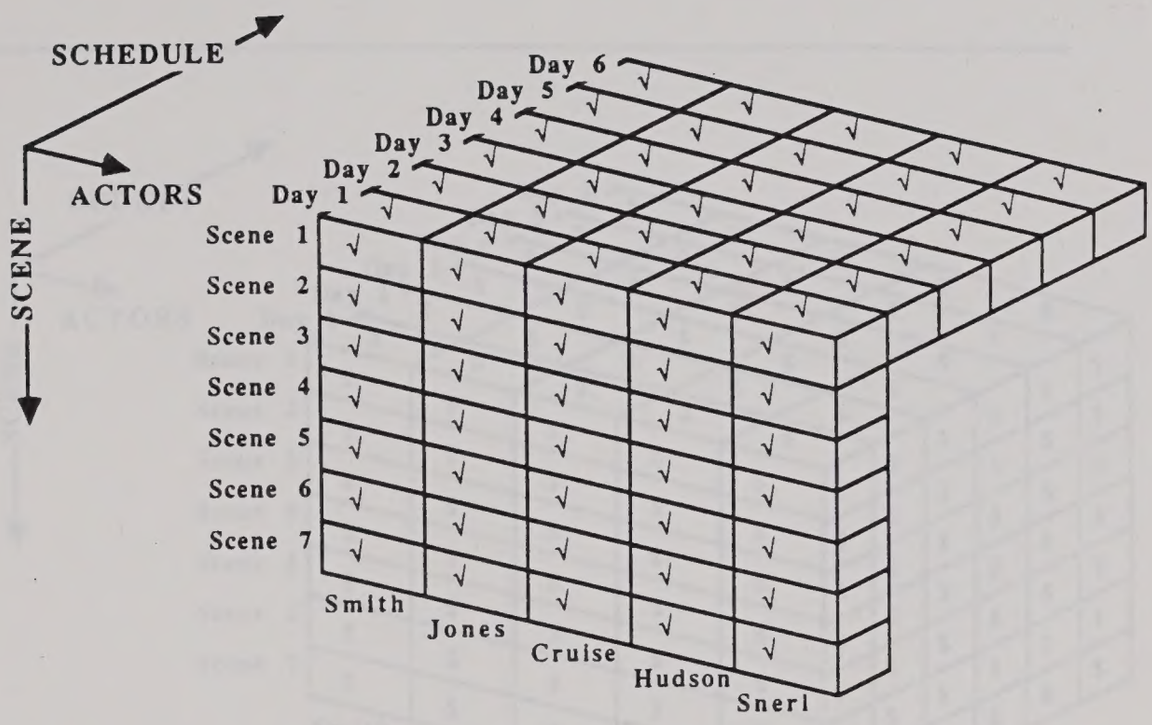
CONFIDENTIAL
TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

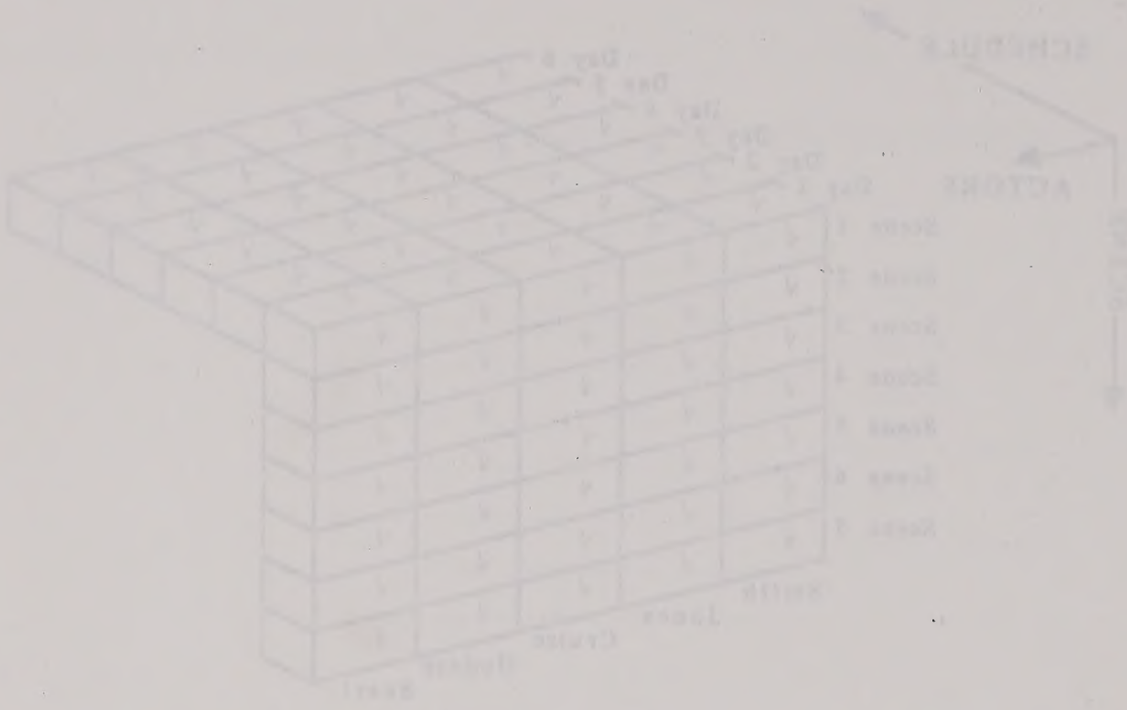
SHOOTING SCHEDULE X SCENE (in hours)

	Day 1	Day 2	Day 3	Day 4	Day 5	Day 6
Scene 1					6	
Scene 1 inserts	1		2			1
Scene 2	6			8		
Scene 2 inserts						2
Scene 3		4				
Scene 3 inserts			1			2
...						

CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

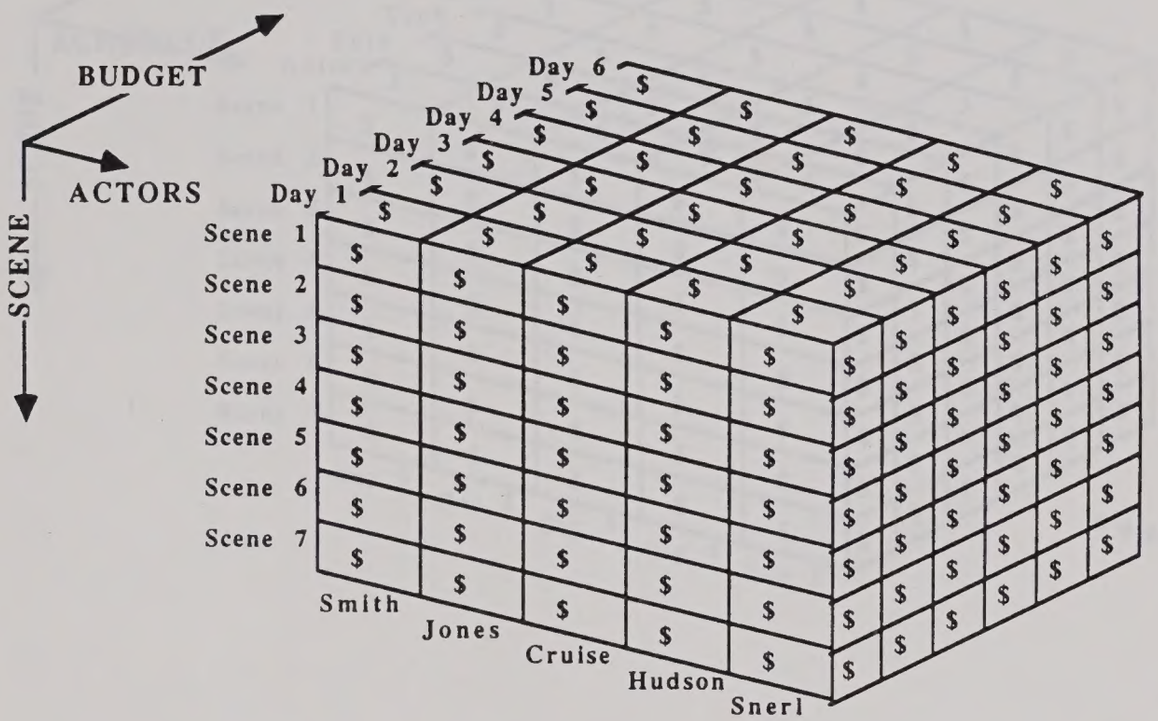
74

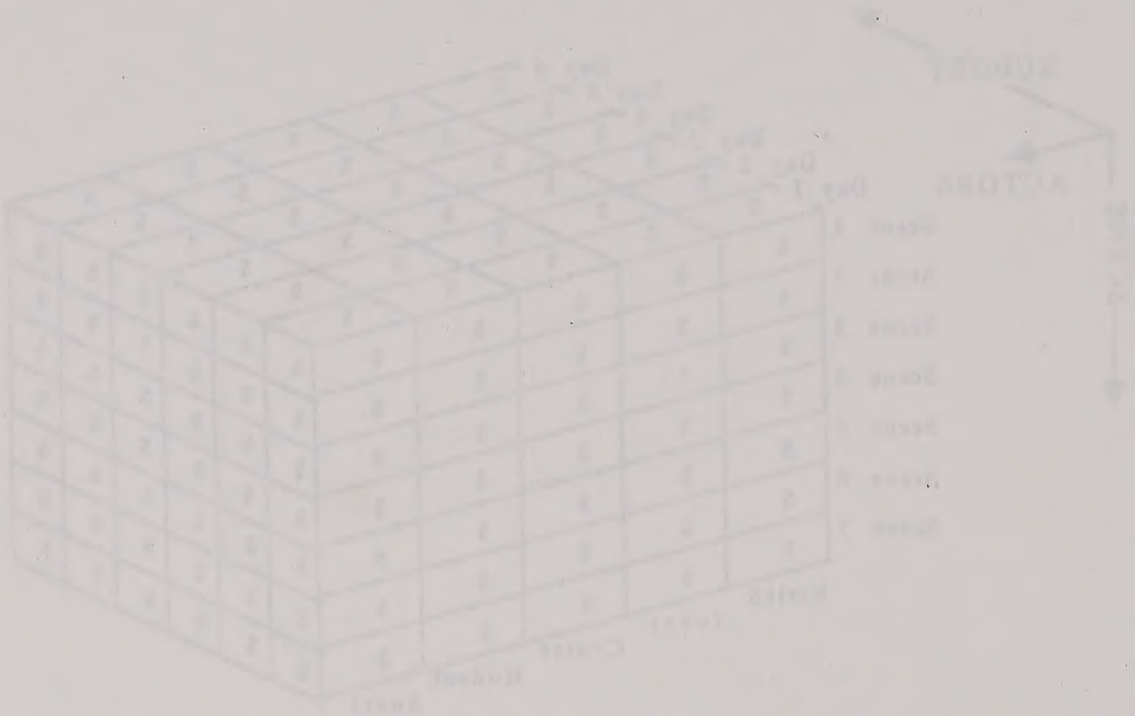




CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

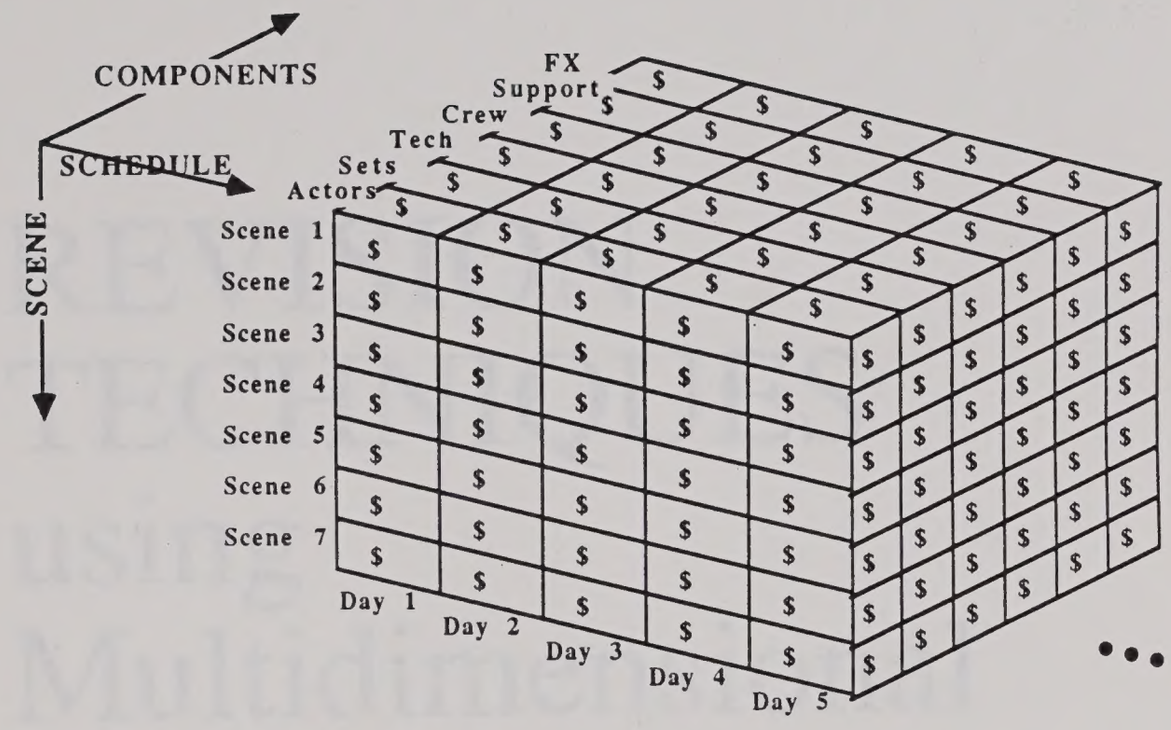
75





CONFIDENTIAL
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

96



ZZ Picbuf4 94q1 d3
94.3.4 page

77

CONFIDENTIAL

TED NELSON
3020 BRIDGEWAY #295
SAUSALITO, CA 94965

REVISION TECHNIQUES using Multidimensional Views

REVISION TECHNIQUES using Multidimensional Views

ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 ∅ Ref

TN, Ookubo.

ZIGZAG MEETING

explaining ZIGZAG to Mr. Oo.

[illegible]

[illegible] to w.o.

[illegible]

[illegible] Oomph.

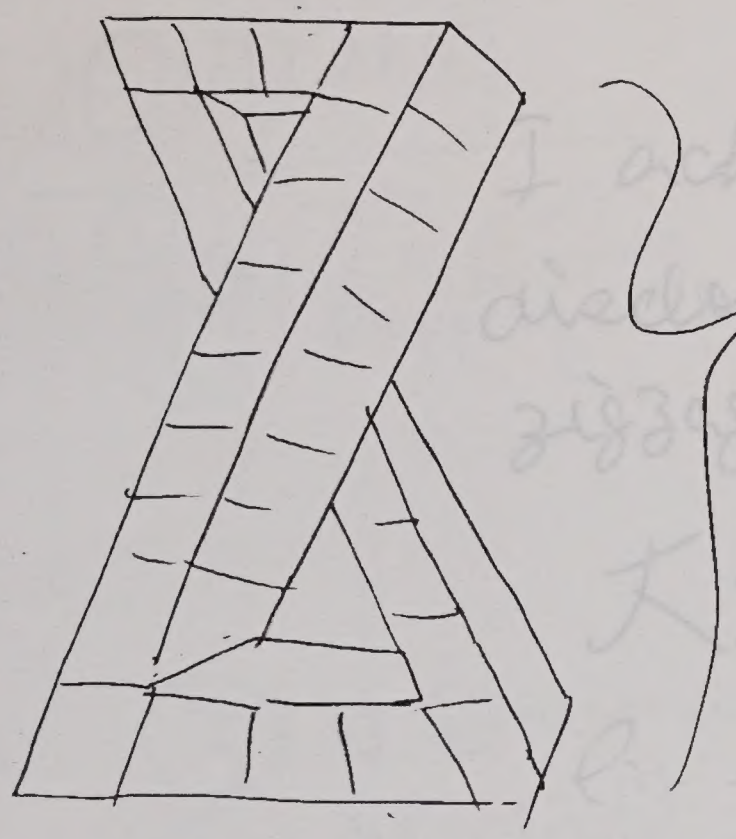
[illegible] JTM

[illegible] 8 2 MAR 1983

[illegible] COMPUTER [illegible]

ZIGZAG CONFIDENTIAL.

MG MAR 2 8 1995 1



ZIGZAG:

LOCALLY CONSISTENT BUT GLOBALLY PARADOXICAL.

Conventional computer systems are mapped into familiar but dead-end metaphors and spaces.

ZigZag is locally familiar & plausible, GLOBALLY STRANGE,
∴ very open-ended.

CASTLE

CASTLE CONSTRUCTION

MAR 8 1882

ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 2

I acknowledge ~~about~~ that Ted Nelson is about to disclose to me in confidence the design of zigzag system.

大久保清覚

In return for 100¥ I agree not to reveal these matters to third parties without permission in advance from Ted Nelson.

1995 3月 29日

[By TN's dating system:
MAR 2 8 1995,
about on 230
min of 28-29.]

DOCUMENT

MAR 2 8 RAM 2881

ZIGZAG CONFIDENTIAL.

MTG MAR 28 1995 3

OUTLINE

① ZZ cell in 2D
③ H & I views
② Mappings to Zspace of: Database
Scheduling / PERT
Outlining
Containment
Programmy Models

③ N Dimensions
④ ND Rotation
⑤ Prog. lgs.
(C) (Lisp / Smal.

CASE COMMENTS

QUIZ #4

1. Web Design Project Scope
2. Client Expectations
3. Web Design Contract

Ch 5 Ch 6 Ch 7

Ch 8 Ch 9 Ch 10

Ch 11 Ch 12 Ch 13

Ch 14 Ch 15 Ch 16

Ch 17 Ch 18 Ch 19

Ch 20 Ch 21 Ch 22

Ch 23 Ch 24 Ch 25

Ch 26 Ch 27 Ch 28

Ch 29 Ch 30 Ch 31

Ch 32 Ch 33 Ch 34

Ch 35 Ch 36 Ch 37

Ch 38 Ch 39 Ch 40

Ch 41 Ch 42 Ch 43

Ch 44 Ch 45 Ch 46

Ch 47 Ch 48 Ch 49

Ch 50 Ch 51 Ch 52

Ch 53 Ch 54 Ch 55

Ch 56 Ch 57 Ch 58

Ch 59 Ch 60 Ch 61

Ch 62 Ch 63 Ch 64

Ch 65 Ch 66 Ch 67

Ch 68 Ch 69 Ch 70

Ch 71 Ch 72 Ch 73

Ch 74 Ch 75 Ch 76

Ch 77 Ch 78 Ch 79

Ch 80 Ch 81 Ch 82

Ch 83 Ch 84 Ch 85

Ch 86 Ch 87 Ch 88

Ch 89 Ch 90 Ch 91

Ch 92 Ch 93 Ch 94

Ch 95 Ch 96 Ch 97

Ch 98 Ch 99 Ch 100

Ch 101 Ch 102 Ch 103

Ch 104 Ch 105 Ch 106

Ch 107 Ch 108 Ch 109

Ch 110 Ch 111 Ch 112

Ch 113 Ch 114 Ch 115

Ch 116 Ch 117 Ch 118

Ch 119 Ch 120 Ch 121

Ch 122 Ch 123 Ch 124

Ch 125 Ch 126 Ch 127

Ch 128 Ch 129 Ch 130

Ch 131 Ch 132 Ch 133

Ch 134 Ch 135 Ch 136

Ch 137 Ch 138 Ch 139

Ch 140 Ch 141 Ch 142

Ch 143 Ch 144 Ch 145

Ch 146 Ch 147 Ch 148

Ch 149 Ch 150 Ch 151

Ch 152 Ch 153 Ch 154

Ch 155 Ch 156 Ch 157

Ch 158 Ch 159 Ch 160

Ch 161 Ch 162 Ch 163

Ch 164 Ch 165 Ch 166

Ch 167 Ch 168 Ch 169

Ch 170 Ch 171 Ch 172

Ch 173 Ch 174 Ch 175

Ch 176 Ch 177 Ch 178

Ch 179 Ch 180 Ch 181

Ch 182 Ch 183 Ch 184

Ch 185 Ch 186 Ch 187

Ch 188 Ch 189 Ch 190

Ch 191 Ch 192 Ch 193

Ch 194 Ch 195 Ch 196

Ch 197 Ch 198 Ch 199

Ch 200 Ch 201 Ch 202

Ch 203 Ch 204 Ch 205

Ch 206 Ch 207 Ch 208

Ch 209 Ch 210 Ch 211

Ch 212 Ch 213 Ch 214

Ch 215 Ch 216 Ch 217

Ch 218 Ch 219 Ch 220

Ch 221 Ch 222 Ch 223

Ch 224 Ch 225 Ch 226

Ch 227 Ch 228 Ch 229

Ch 230 Ch 231 Ch 232

Ch 233 Ch 234 Ch 235

Ch 236 Ch 237 Ch 238

Ch 239 Ch 240 Ch 241

Ch 242 Ch 243 Ch 244

Ch 245 Ch 246 Ch 247

Ch 248 Ch 249 Ch 250

Ch 251 Ch 252 Ch 253

Ch 254 Ch 255 Ch 256

Ch 257 Ch 258 Ch 259

Ch 260 Ch 261 Ch 262

Ch 263 Ch 264 Ch 265

Ch 266 Ch 267 Ch 268

Ch 269 Ch 270 Ch 271

Ch 272 Ch 273 Ch 274

Ch 275 Ch 276 Ch 277

Ch 278 Ch 279 Ch 280

Ch 281 Ch 282 Ch 283

Ch 284 Ch 285 Ch 286

Ch 287 Ch 288 Ch 289

Ch 290 Ch 291 Ch 292

Ch 293 Ch 294 Ch 295

Ch 296 Ch 297 Ch 298

Ch 299 Ch 300 Ch 301

Ch 302 Ch 303 Ch 304

Ch 305 Ch 306 Ch 307

Ch 308 Ch 309 Ch 310

Ch 311 Ch 312 Ch 313

Ch 314 Ch 315 Ch 316

Ch 317 Ch 318 Ch 319

Ch 320 Ch 321 Ch 322

Ch 323 Ch 324 Ch 325

Ch 326 Ch 327 Ch 328

Ch 329 Ch 330 Ch 331

Ch 332 Ch 333 Ch 334

Ch 335 Ch 336 Ch 337

Ch 338 Ch 339 Ch 340

Ch 341 Ch 342 Ch 343

Ch 344 Ch 345 Ch 346

Ch 347 Ch 348 Ch 349

Ch 350 Ch 351 Ch 352

Ch 353 Ch 354 Ch 355

Ch 356 Ch 357 Ch 358

Ch 359 Ch 360 Ch 361

Ch 362 Ch 363 Ch 364

Ch 365 Ch 366 Ch 367

Ch 368 Ch 369 Ch 370

Ch 371 Ch 372 Ch 373

Ch 374 Ch 375 Ch 376

Ch 377 Ch 378 Ch 379

Ch 380 Ch 381 Ch 382

Ch 383 Ch 384 Ch 385

Ch 386 Ch 387 Ch 388

Ch 389 Ch 390 Ch 391

Ch 392 Ch 393 Ch 394

Ch 395 Ch 396 Ch 397

Ch 398 Ch 399 Ch 400

Ch 401 Ch 402 Ch 403

Ch 404 Ch 405 Ch 406

Ch 407 Ch 408 Ch 409

Ch 410 Ch 411 Ch 412

Ch 413 Ch 414 Ch 415

Ch 416 Ch 417 Ch 418

Ch 419 Ch 420 Ch 421

Ch 422 Ch 423 Ch 424

Ch 425 Ch 426 Ch 427

Ch 428 Ch 429 Ch 430

Ch 431 Ch 432 Ch 433

Ch 434 Ch 435 Ch 436

Ch 437 Ch 438 Ch 439

Ch 440 Ch 441 Ch 442

Ch 443 Ch 444 Ch 445

Ch 446 Ch 447 Ch 448

Ch 449 Ch 450 Ch 451

Ch 452 Ch 453 Ch 454

Ch 455 Ch 456 Ch 457

Ch 458 Ch 459 Ch 460

Ch 461 Ch 462 Ch 463

Ch 464 Ch 465 Ch 466

Ch 467 Ch 468 Ch 469

Ch 470 Ch 471 Ch 472

Ch 473 Ch 474 Ch 475

Ch 476 Ch 477 Ch 478

Ch 479 Ch 480 Ch 481

Ch 482 Ch 483 Ch 484

Ch 485 Ch 486 Ch 487

Ch 488 Ch 489 Ch 490

Ch 491 Ch 492 Ch 493

Ch 494 Ch 495 Ch 496

Ch 497 Ch 498 Ch 499

Ch 500 Ch 501 Ch 502

Ch 503 Ch 504 Ch 505

Ch 506 Ch 507 Ch 508

Ch 509 Ch 510 Ch 511

Ch 512 Ch 513 Ch 514

Ch 515 Ch 516 Ch 517

Ch 518 Ch 519 Ch 520

Ch 521 Ch 522 Ch 523

Ch 524 Ch 525 Ch 526

Ch 527 Ch 528 Ch 529

Ch 530 Ch 531 Ch 532

Ch 533 Ch 534 Ch 535

Ch 536 Ch 537 Ch 538

Ch 539 Ch 540 Ch 541

Ch 542 Ch 543 Ch 544

Ch 545 Ch 546 Ch 547

Ch 548 Ch 549 Ch 550

Ch 551 Ch 552 Ch 553

Ch 554 Ch 555 Ch 556

Ch 557 Ch 558 Ch 559

Ch 560 Ch 561 Ch 562

Ch 563 Ch 564 Ch 565

Ch 566 Ch 567 Ch 568

Ch 569 Ch 570 Ch 571

Ch 572 Ch 573 Ch 574

Ch 575 Ch 576 Ch 577

Ch 578 Ch 579 Ch 580

Ch 581 Ch 582 Ch 583

Ch 584 Ch 585 Ch 586

Ch 587 Ch 588 Ch 589

Ch 590 Ch 591 Ch 592

Ch 593 Ch 594 Ch 595

Ch 596 Ch 597 Ch 598

Ch 599 Ch 600 Ch 601

Ch 602 Ch 603 Ch 604

Ch 605 Ch 606 Ch 607

Ch 608 Ch 609 Ch 610

Ch 611 Ch 612 Ch 613

Ch 614 Ch 615 Ch 616

Ch 617 Ch 618 Ch 619

Ch 620 Ch 621 Ch 622

Ch 623 Ch 624 Ch 625

Ch 626 Ch 627 Ch 628

Ch 629 Ch 630 Ch 631

Ch 632 Ch 633 Ch 634

Ch 635 Ch 636 Ch 637

Ch 638 Ch 639 Ch 640

Ch 641 Ch 642 Ch 643

Ch 644 Ch 645 Ch 646

Ch 647 Ch 648 Ch 649

Ch 650 Ch 651 Ch 652

Ch 653 Ch 654 Ch 655

Ch 656 Ch 657 Ch 658

Ch 659 Ch 660 Ch 661

Ch 662 Ch 663 Ch 664

Ch 665 Ch 666 Ch 667

Ch 668 Ch 669 Ch 670

Ch 671 Ch 672 Ch 673

Ch 674 Ch 675 Ch 676

Ch 677 Ch 678 Ch 679

Ch 680 Ch 681 Ch 682

Ch 683 Ch 684 Ch 685

Ch 686 Ch 687 Ch 688

Ch 689 Ch 690 Ch 691

Ch 692 Ch 693 Ch 694

Ch 695 Ch 696 Ch 697

Ch 698 Ch 699 Ch 700

Ch 701 Ch 702 Ch 703

Ch 704 Ch 705 Ch 706

Ch 707 Ch 708 Ch 709

Ch 710 Ch 711 Ch 712

Ch 713 Ch 714 Ch 715

Ch 716 Ch 717 Ch 718

Ch 719 Ch 720 Ch 721

Ch 722 Ch 723 Ch 724

Ch 725 Ch 726 Ch 727

Ch 728 Ch 729 Ch 730

Ch 731 Ch 732 Ch 733

Ch 734 Ch 735 Ch 736

Ch 737 Ch 738 Ch 739

Ch 740 Ch 741 Ch 742

Ch 743 Ch 744 Ch 745

Ch 746 Ch 747 Ch 748

Ch 749 Ch 750 Ch 751

Ch 752 Ch 753 Ch 754

Ch 755 Ch 756 Ch 757

Ch 758 Ch 759 Ch 760

Ch 761 Ch 762 Ch 763

Ch 764 Ch 765 Ch 766

Ch 767 Ch 768 Ch 769

Ch 770 Ch 771 Ch 772

Ch 773 Ch 774 Ch 775

Ch 776 Ch 777 Ch 778

Ch 779 Ch 780 Ch 781

Ch 782 Ch 783 Ch 784

Ch 785 Ch 786 Ch 787

Ch 788 Ch 789 Ch 790

Ch 791 Ch 792 Ch 793

Ch 794 Ch 795 Ch 796

Ch 797 Ch 798 Ch 799

Ch 800 Ch 801 Ch 802

Ch 803 Ch 804 Ch 805

Ch 806 Ch 807 Ch 808

Ch 809 Ch 810 Ch 811

Ch 812 Ch 813 Ch 814

Ch 815 Ch 816 Ch 817

Ch 818 Ch 819 Ch 820

Ch 821 Ch 822 Ch 823

Ch 824 Ch 825 Ch 826

Ch 827 Ch 828 Ch 829

Ch 830 Ch 831 Ch 832

Ch 833 Ch 834 Ch 835

Ch 836 Ch 837 Ch 838

Ch 839 Ch 840 Ch 841

Ch 842 Ch 843 Ch 844

Ch 845 Ch 846 Ch 847

Ch 848 Ch 849 Ch 850

Ch 851 Ch 852 Ch 853

Ch 854 Ch 855 Ch 856

Ch 857 Ch 858 Ch 859

Ch 860 Ch 861 Ch 862

Ch 863 Ch 864 Ch 865

Ch 866 Ch 867 Ch 868

Ch 869 Ch 870 Ch 871

Ch 872 Ch 873 Ch 874

Ch 875 Ch 876 Ch 877

Ch 878 Ch 879 Ch 880

Ch 881 Ch 882 Ch 883

Ch 884 Ch 885 Ch 886

Ch 887 Ch 888 Ch 889

Ch 890 Ch 891 Ch 892

Ch 893 Ch 894 Ch 895

Ch 896 Ch 897 Ch 898

Ch 899 Ch 900 Ch 901

Ch 902 Ch 903 Ch 904

Ch 905 Ch 906 Ch 907

Ch 908 Ch 909 Ch 910

Ch 911 Ch 912 Ch 913

Ch 914 Ch 915 Ch 916

Ch 917 Ch 918 Ch 919

Ch 920 Ch 921 Ch 922

Ch 923 Ch 924 Ch 925

Ch 926 Ch 927 Ch 928

Ch 929 Ch 930 Ch 931

Ch 932 Ch 933 Ch 934

Ch 935 Ch 936 Ch 937

Ch 938 Ch 939 Ch 940

Ch 941 Ch 942 Ch 943

Ch 944 Ch 945 Ch 946

Ch 947 Ch 948 Ch 949

Ch 950 Ch 951 Ch 952

Ch 953 Ch 954 Ch 955

Ch 956 Ch 957 Ch 958

Ch 959 Ch 960 Ch 961

Ch 962 Ch 963 Ch 964

Ch 965 Ch 966 Ch 967

Ch 968 Ch 969 Ch 970

Ch 971 Ch 972 Ch 973

Ch 974 Ch 975 Ch 976

Ch 977 Ch 978 Ch 979

Ch 980 Ch 981 Ch 982

Ch 983 Ch 984 Ch 985

Ch 986 Ch 987 Ch 988

Ch 989 Ch 990 Ch 991

Ch 992 Ch 993 Ch 994

Ch 995 Ch 996 Ch 997

Ch 998 Ch 999 Ch 1000

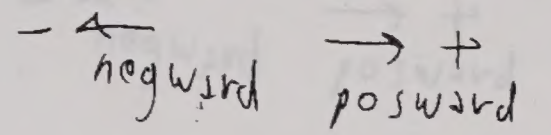
ZIGZAG CONFIDENTIAL.

MTF MAR 2 8 1995 4

QUANTUM HYPERSPACE:

DISCRETE ELEMENTS
CONNECTABLE IN
AN EVER-EXPANDING
NUMBER OF DIMENSIONS.

DIMENSION: SPACE OF CONNECTIVITY WITH A SPECIFIC NAME
AND TWO DIRECTIONS



EVOLUTION MUTUALISM

ESSAY COMPONENT:

W/R 4MB S 8 GB

- PARTICLE ECOSYSTEMS
- CONNECT-ABLE IN
- AN ENERGY-EXCHANGING
- AN NUMBER OF DIMENSIONS

DIMENSION : SPACE OF CONNECTIVITY WITH A SPECIFIC NAME
AND TWO DIRECTIONS

positive polarity
+ →
- ←

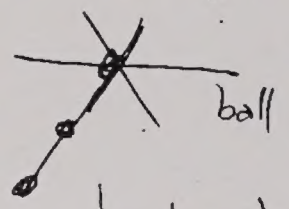
ZIGZAG CONFIDENTIAL.

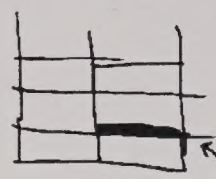
MTG MAR 2 8 1995

QUANTUM HYPERSPACE:

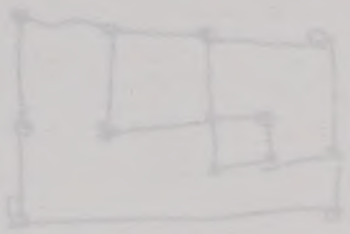
DISCRETE ELEMENTS
CONNECTABLE IN
AN EVER-EXPANDING
NUMBER OF DIMENSIONS.

DIFFERENT VISUALIZATIONS OF CELL DIMS:





DIMENSION : SPACE OF CONNECTIVITY WITH A SPECIFIC NAME AND TWO DIRECTIONS



− ← negward → + posward

QUANTUM ANALOGY

Circuit Components:

Resistor
Voltage Source
Current Source
Ground

Resistor: Quantum Tunneling Barrier
Voltage Source: Potential Energy Difference
Current Source: Particle Flow Rate
Ground: Reference Point for Measurement

Circuit Analysis: Schrödinger Equation
Kirchhoff's Laws: Conservation of Probability
Ohm's Law: Relationship between Tunneling Rate, Voltage, and Barrier Properties

Quantum Circuit Simulation: Software Tools
Quantum Circuit Design: Optimization Techniques
Quantum Circuit Fabrication: Nanofabrication Techniques
Quantum Circuit Testing: Measurement Techniques

Applications:
Quantum Computing
Quantum Communication
Quantum Sensing
Quantum Metrology

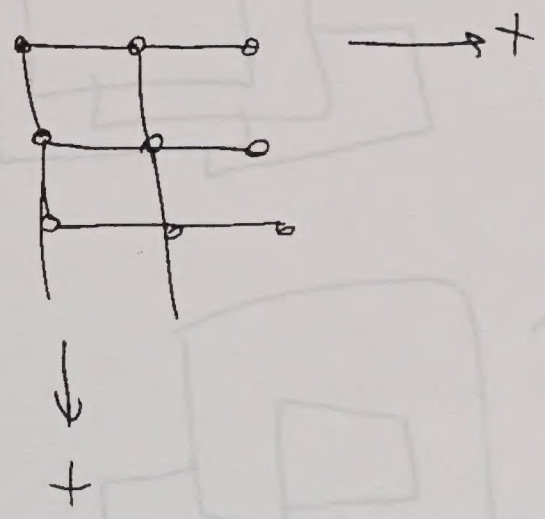
Challenges:
Decoherence
Noise
Scalability
Error Correction

Future Directions:
Topological Quantum Circuits
Quantum Circuit Networks
Quantum Circuit Integration with Classical Systems

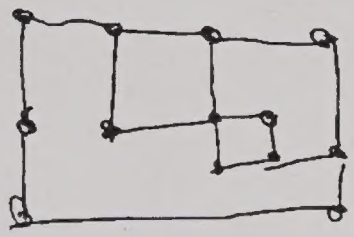
ZIGZAG CONFIDENTIAL.

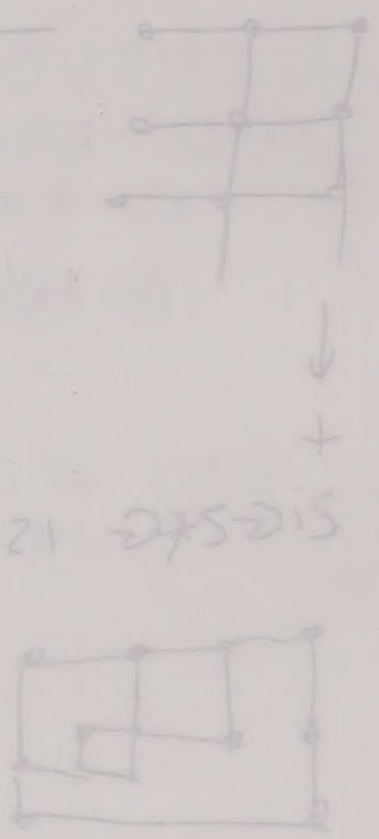
NTG MAR 2 8 1995 6

SPREADSHEET IN CONVENTIONAL SPACE



SPREADSHEET IN ZIGZAG IS MORE FLEXIBLE —



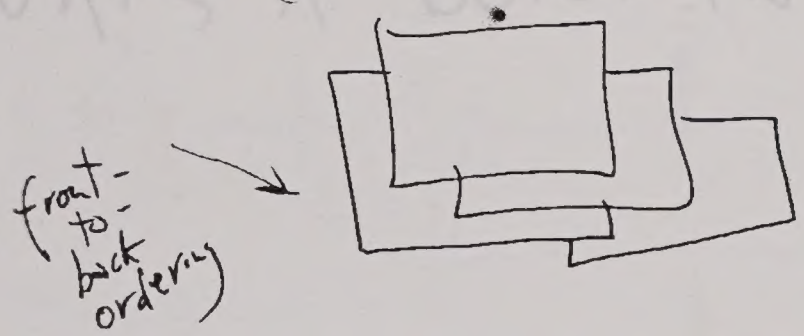


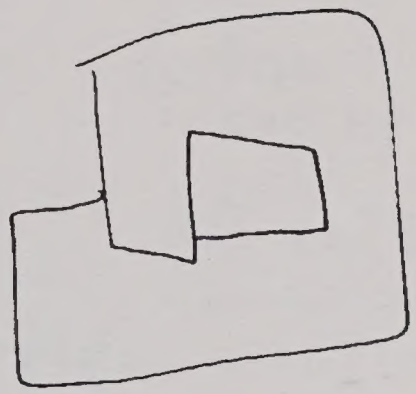
ZIGZAG CONFIDENTIAL.

ATG MAR 2 8 1995

7

2½D (Ron Baecker)





← Zgzg N.6D

ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 8

ALWAYS A BUILT-IN VISUALIZATION.

CASE CONFIDENTIEL

AIMAR A BUIS-LA-VILLE A LYMAVILLA

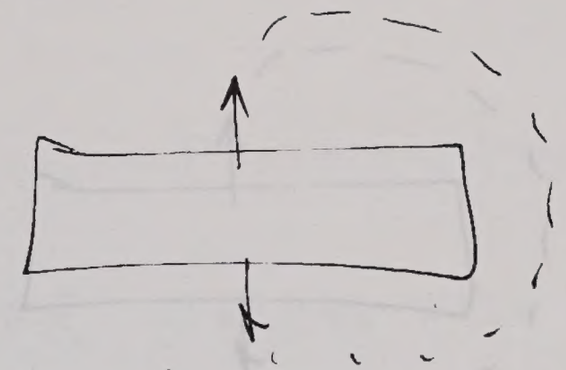
Mme Mme S B BBBB

ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 9

THE 2D CELL..

$0 \leq n \leq 4$ connections



A cell participates in a dimension if it has a connection in that dimension.

bottom must be connected to a top

left must be connected to right

THE ND CELL — — — Generalization: - must connect to ± in each dimension

Do: "hypertorus"

CASE COMPLEMENT

MAR 28 1980 SDM

Physics 190 A

Assignment #3

Due Thursday, Feb. 28

Potential

Find the potential at point P

Find the field at point P

Find the force on a point charge q at point P

Find the potential energy of a point charge q at point P

Find the work required to move a point charge q from point P to infinity

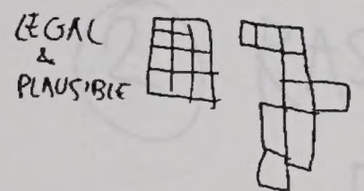
THE END

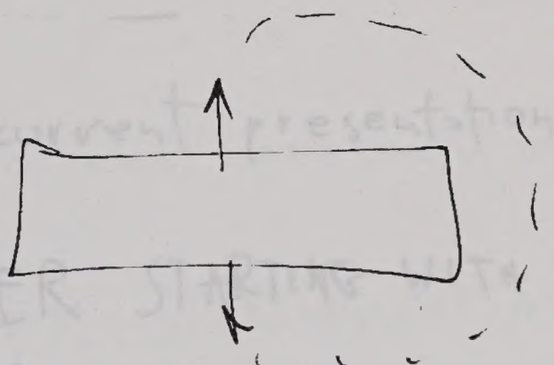
ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 10

THE 2D CELL

$0 \leq n \leq 4$ connections

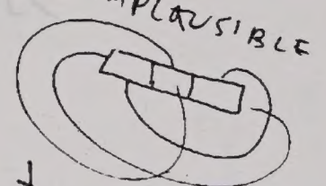




bottom must be connected to ↑ top

left must be connected to right

A cell participates in a dimension if it has a connection in that dimension.



THE ND CELL

Generalization: - must connect to ↑ in each dimension

Ex: 'hypertorus'

CASE COMMENTARY

THE CASE

THE INDICATOR

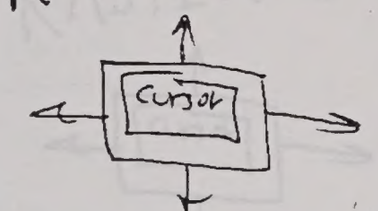
ZIGZAG CONFIDENTIAL.

MRF MAR 2 8 1995 ||

SCREEN REFRESH

1. Cell's current presentation

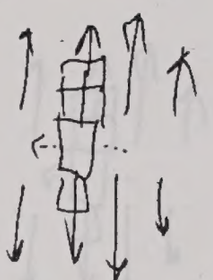
2. RASTER STARTING WITH THIS CELL



pattern of refresh —

H-view (verticals)

I-view (horizontals)



MAY 8 8 1982 11

SCREEN DESIGN

CASE TOOL

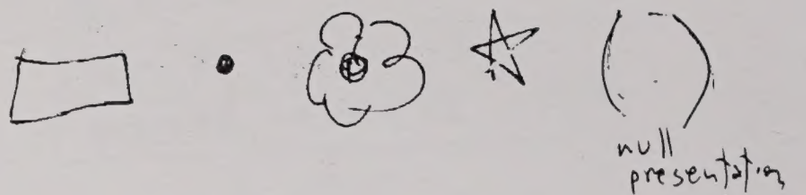
1. Call ? convert transaction

2. RATIONAL RATIONAL WITH THIS CEO

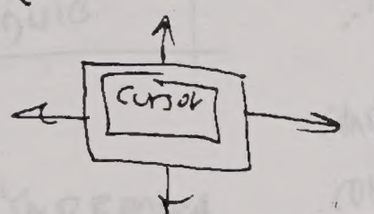
ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 12

SCREEN REFRESH

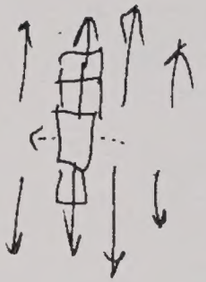
(1) Cell's current presentation 

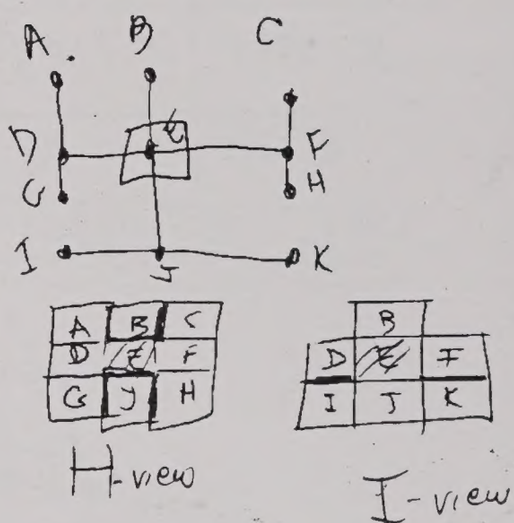
(2) RASTER STARTING WITH THIS CELL



H-view (verticals)

I-view (horizontals)





2 USEN KEYENCE

1. Cell 2 convert transparent

2. Keyence Matrix 2 cell

ZIGZAG CONFIDENTIAL.

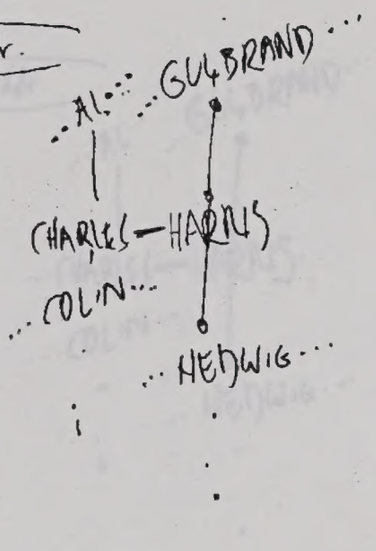
MTG MAR 2 8 1995 | 3

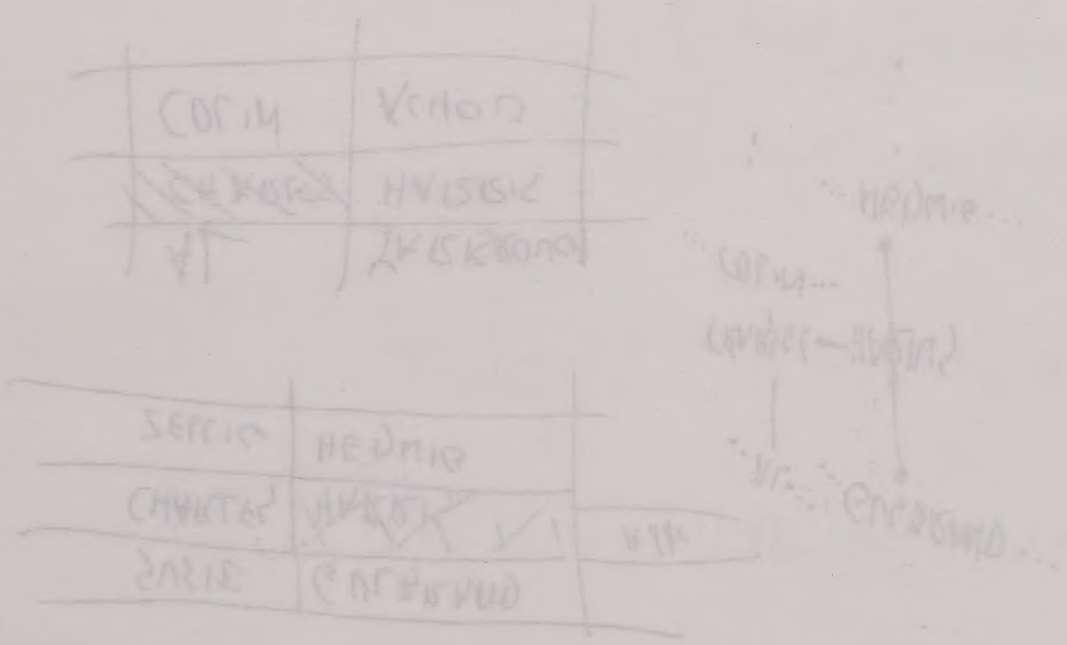
POWER OF CURSOR MOVES:

DATABASE

SUSIE	GULBRAND	
CHARLES	HARRIS	Addr.
ZELLIG	HEDWIG	

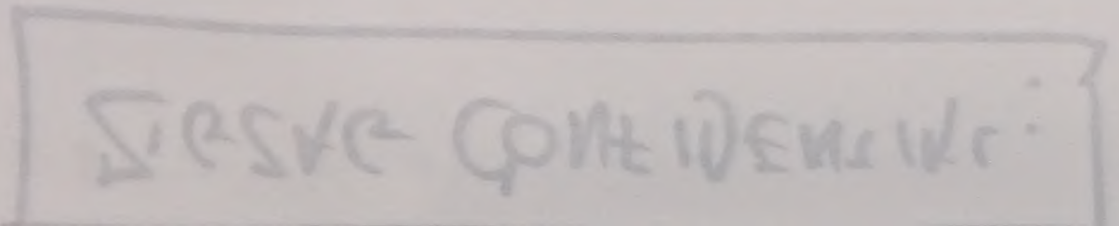
AL	YARBROUGH
~~CHARLES~~	HARRIS
COLIN	ACHOO





DIVERSE

BOMBE DE GUERRE MONDE:



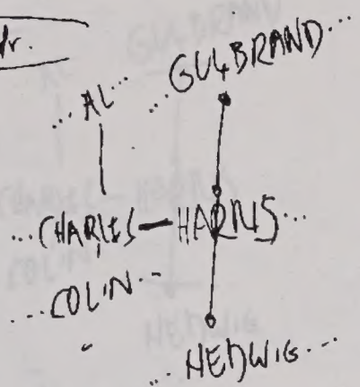
ZIGZAG CONFIDENTIAL.

MTG MAR 28 1995 14

POWER OF CURSOR MOVES:

DATABASE

SUSIE	GULBRAND	
CHARLES	~~HARRIS~~	Addr.
ZELLIG	HEDWIG	



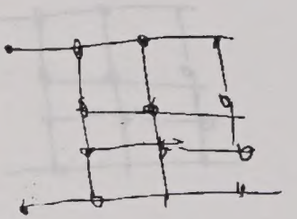
~~AL~~	YARBROUGH
~~CHARLES~~	HARRIS
COLIN	ACHOO

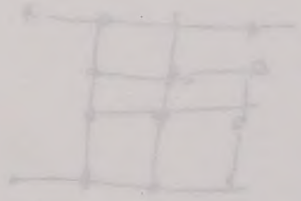
OUTLINER

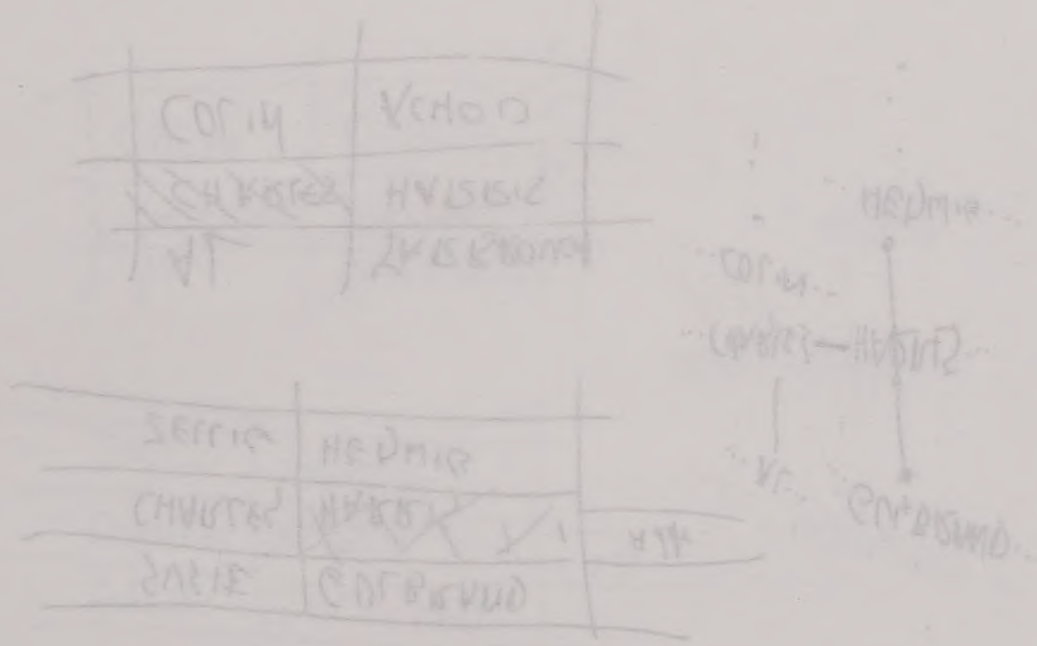
~~THIS IS~~	LEVEL	I
ANOTHER	LEVEL	I ITEM

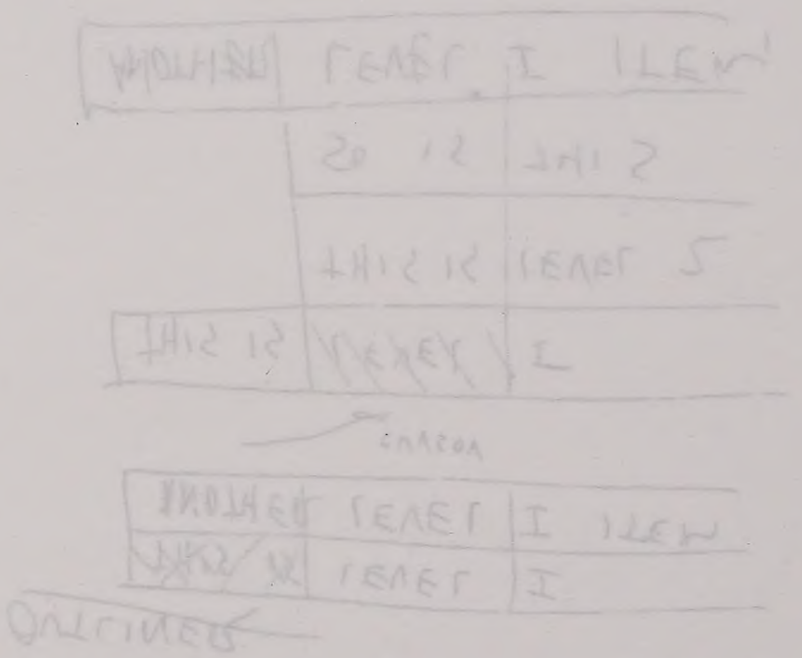
CURSOR

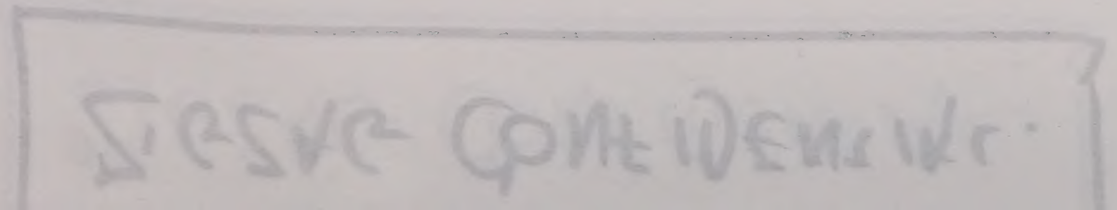
THIS IS	~~LEVEL~~	I
	THIS IS	LEVEL 2
	SO IS	THIS
ANOTHER	LEVEL	I ITEM











ZIGZAG CONFIDENTIAL.

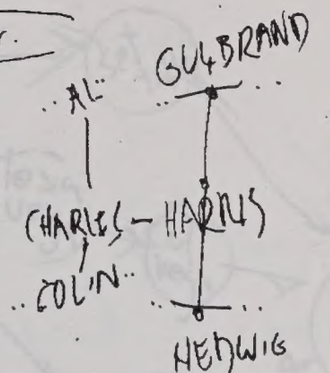
MTG MAR 2 8 1995 15

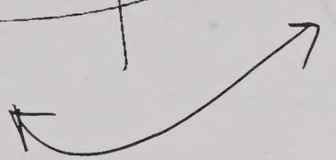
POWER OF CURSOR MOVES:

DATABASE

SUSIE	GULBRAND	Addr.
CHARLES	HARRIS	
ZELLIG	HEDWIG	

AL	YARBROUGH
CHARLES	HARRIS
COLIN	ACHOO





↘ ≠ ↳ BUT ↘ reverses ↰

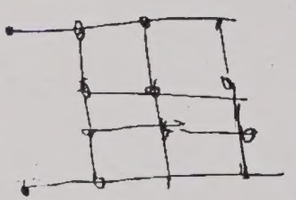
Mr Oo: DIAG. DISTANCE NOT RATIONAL.

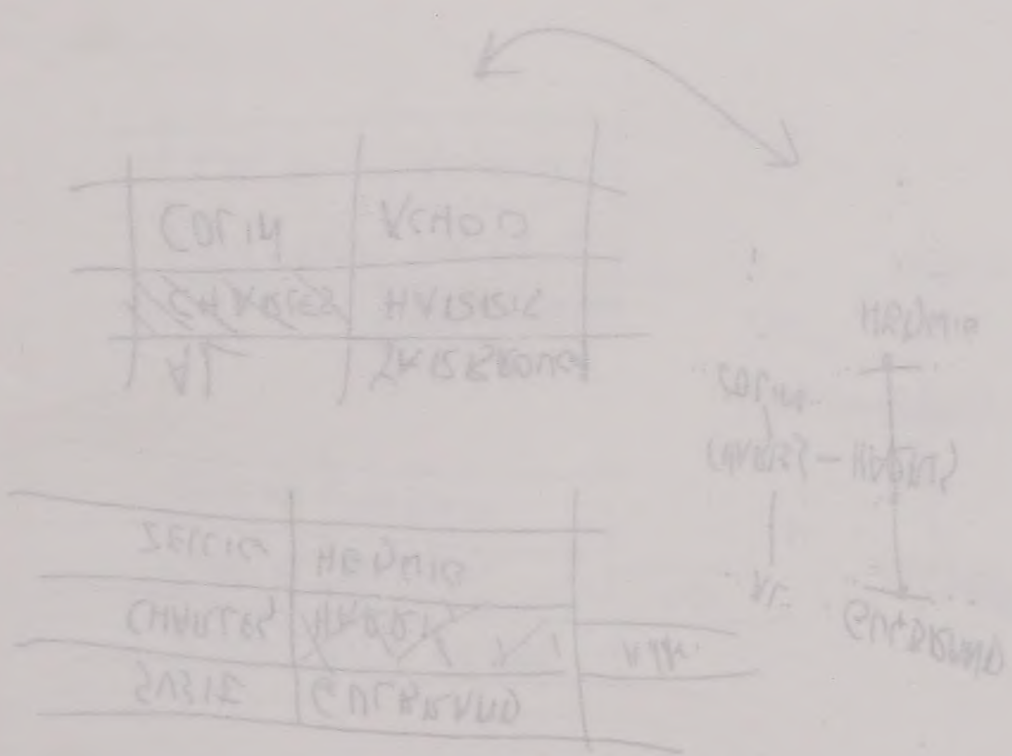
OUTLINER

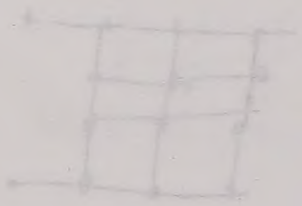
THIS IS	LEVEL	I
ANOTHER	LEVEL	I ITEM

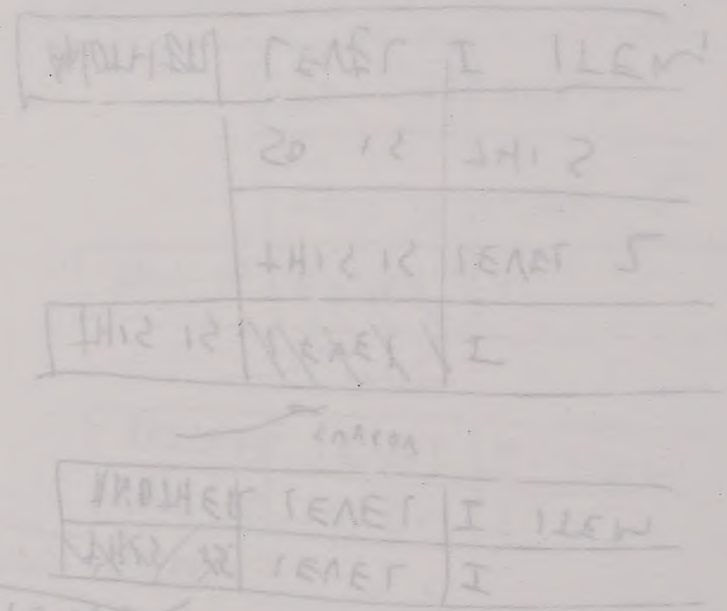
CURSOR

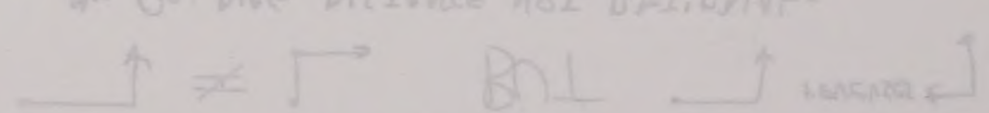
THIS IS	LEVEL	I
	THIS IS	LEVEL 2
	SO IS	THIS
ANOTHER	LEVEL	I ITEM

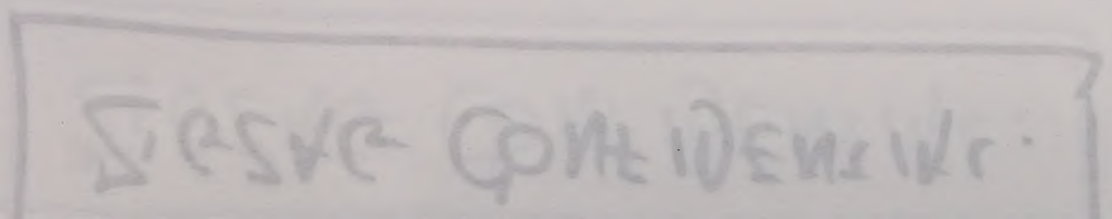










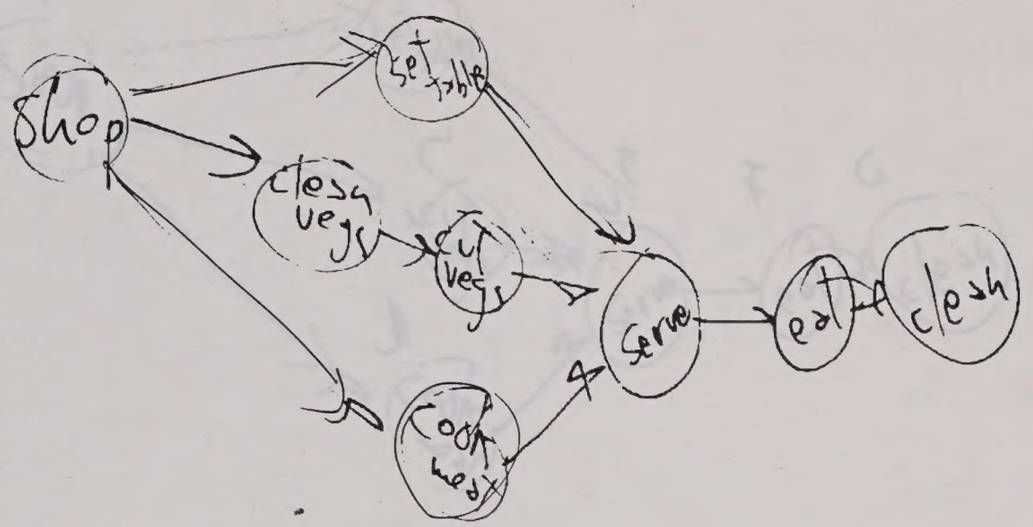


ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 16

SCHEDULING

PERT : precedence mapping of a plan



TASK DEPENDENCY

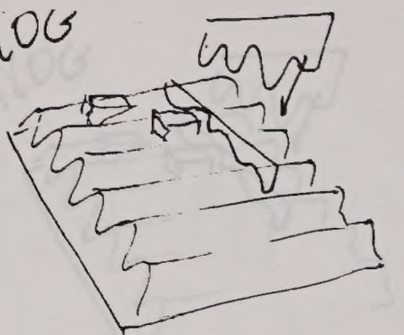
SCHEDULING

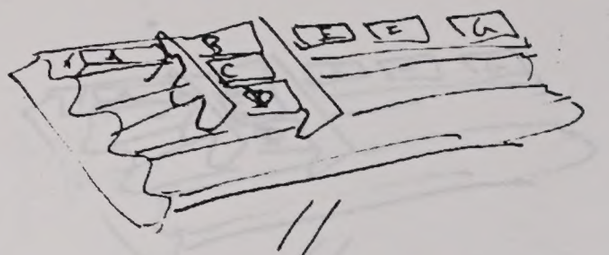
ZIGZAG CONFIDENTIAL.

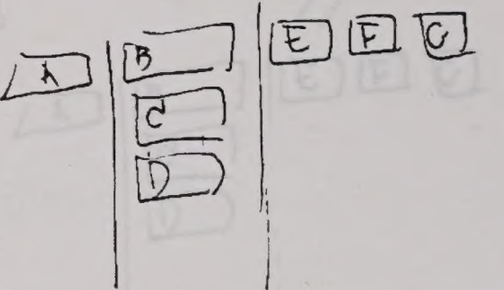
MTG MAR 2 8 1995 17

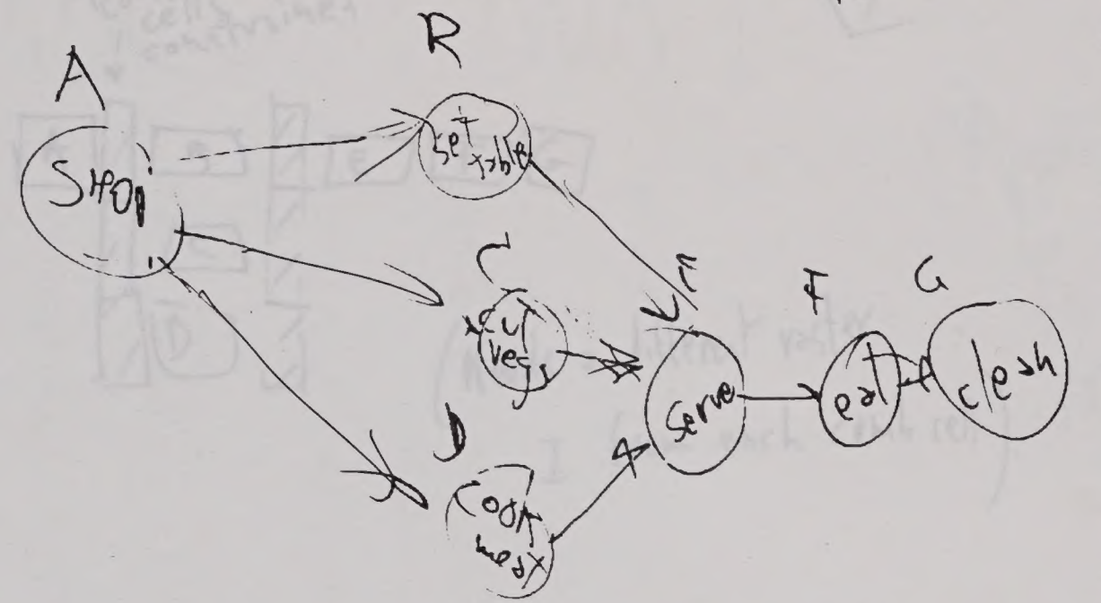
SCHEDULING

PLANALOG







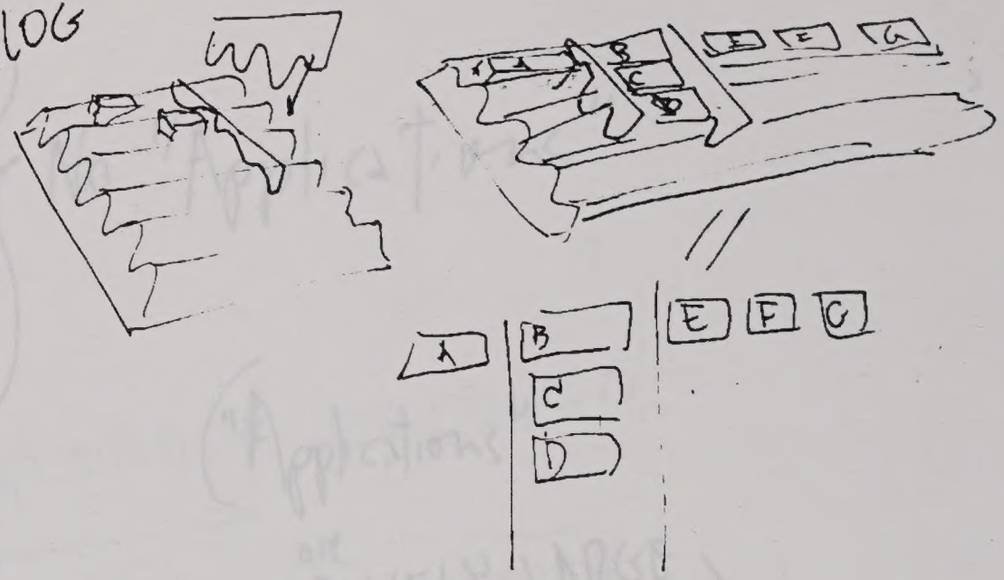


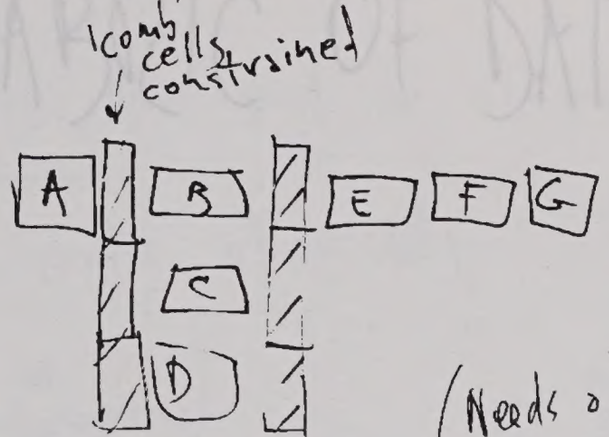
ZIGZAG CONFIDENTIAL.

NTTG MAR 2 8 1995 18

SCHEDULING

PLANALOG





(Needs a different raster
I from each comb cell)

NB

CASE COMPONENT:

SCHEDULING

PLANNING

MAR 28 2005 18

ZIGZAG CONFIDENTIAL.

MDF MAR 2 8 1995 19

ONE SPACE
ONE FABRIC OF DATA

} No "Applications"

("Applications"
are
FALSELY LARGE
PROGRAMS.)

MAR 8 8 AM '88

CLASS-COMPUTER.

ONE PLACE

ONE PLASTIC OF PAY (NO "ADDITIONS")

"Hello, world!"

ABOARD NOW?
FASTEST CRUISE
IN

ZIGZAG CONFIDENTIAL.

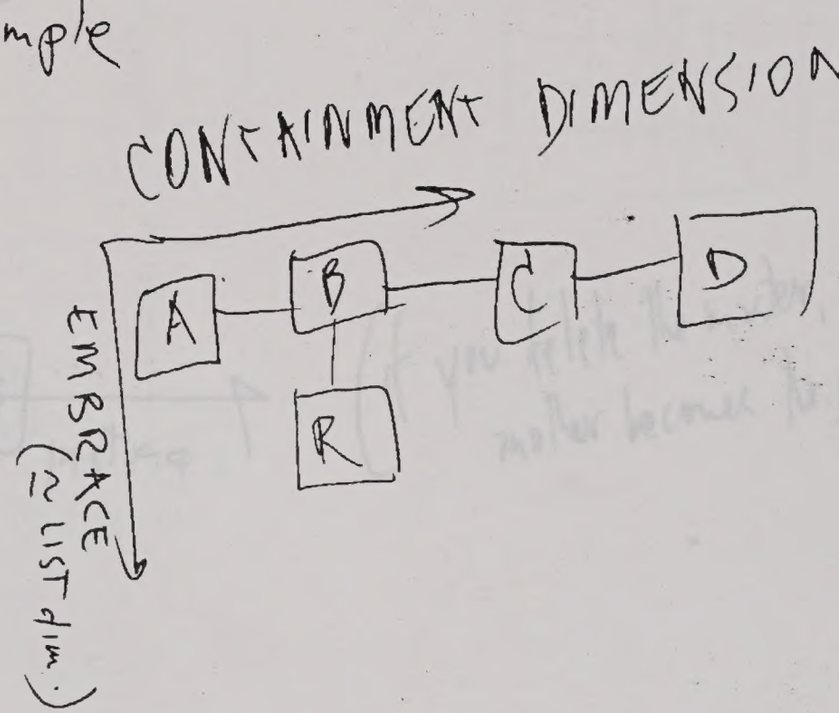
MTG MAR 2 8 1995 20

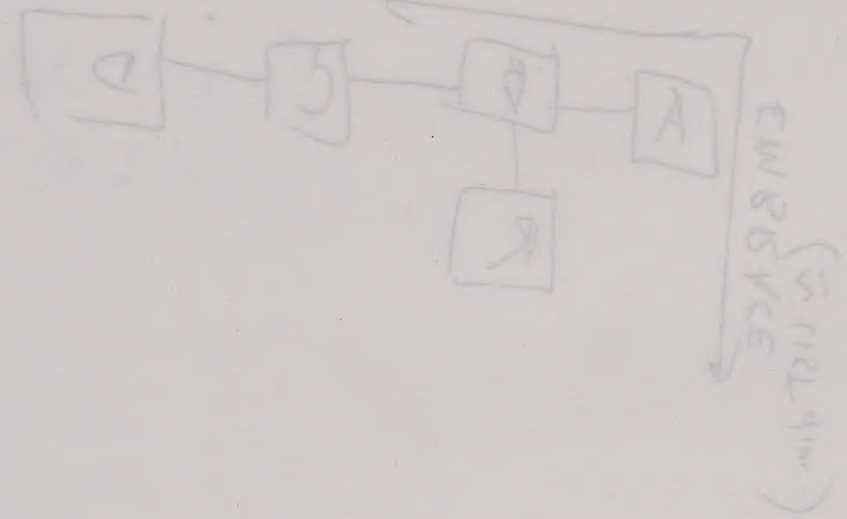
CELL CAN BE EXECUTED

Prim. programs shd be simple

Cell can contain other cells.

(such as subprograms)

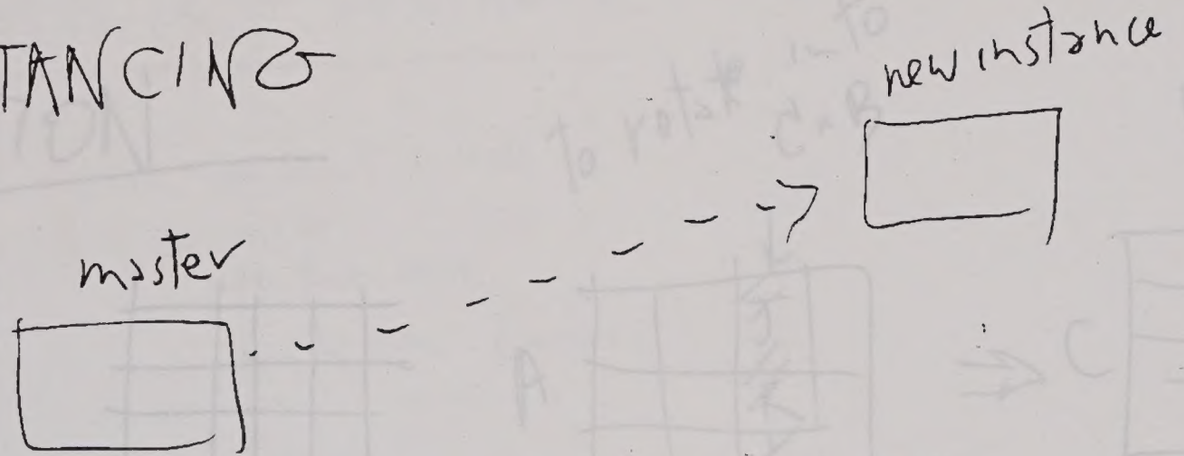


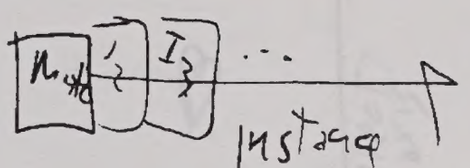

A
B
C
D
E
CONTAINMENT DIMENSION

ZIGZAG CONFIDENTIAL.

MIT MAR 2 8 1995 21

INSTANCING





(if you delete the master, another becomes the master)

CASE COMPUTER

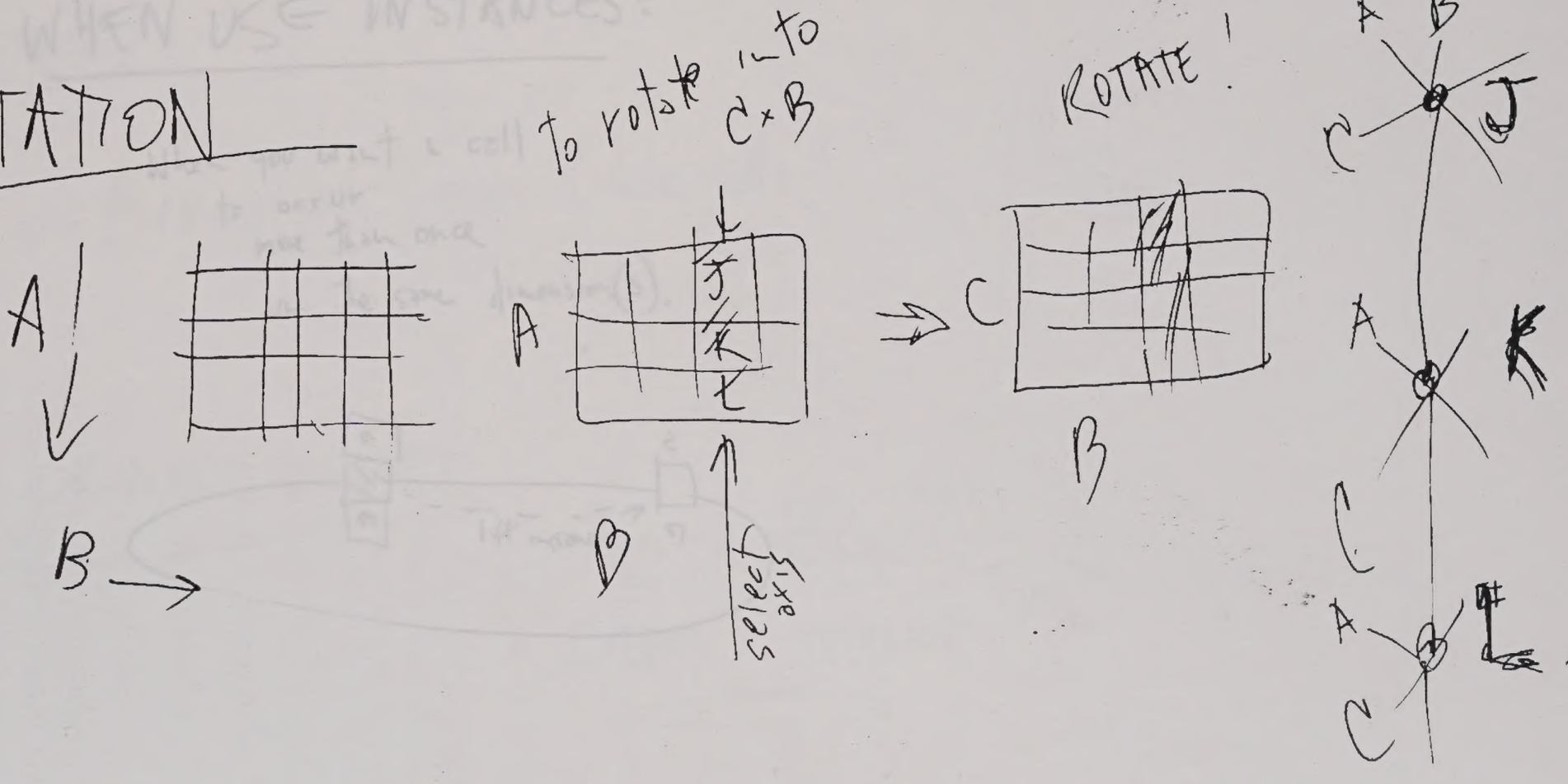
MAR 2 8 2005 AM

INSTANCIAS

ZIGZAG CONFIDENTIAL.

NTG MAR 2 8 1995 22

ROTATION



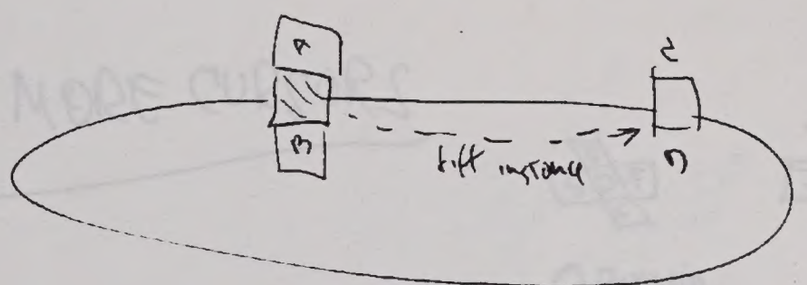
Задача сложности 1

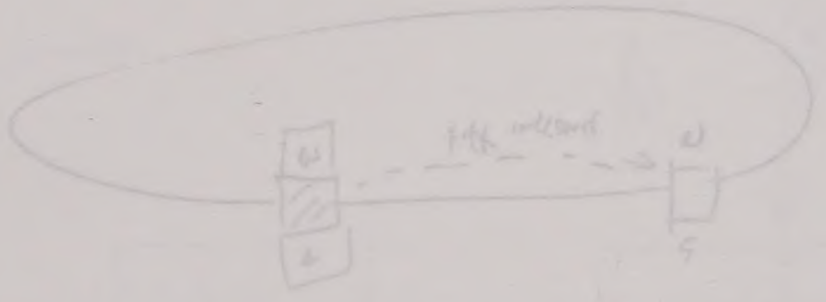
ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 23

WHEN USE INSTANCES?

When you want a cell
to occur
more than once
in the same dimension(s).





MAKE RE MSTANCES:

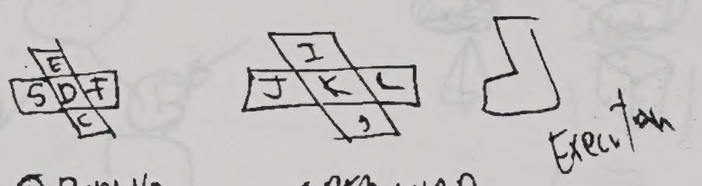
ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 24

MENU

Array of executable cells!

TWO OR MORE CURSORS



CASE CONTINUED...

PS 888 8 S HAH MK

MEMO

Attach to exam copy

No OK Wave Gesture

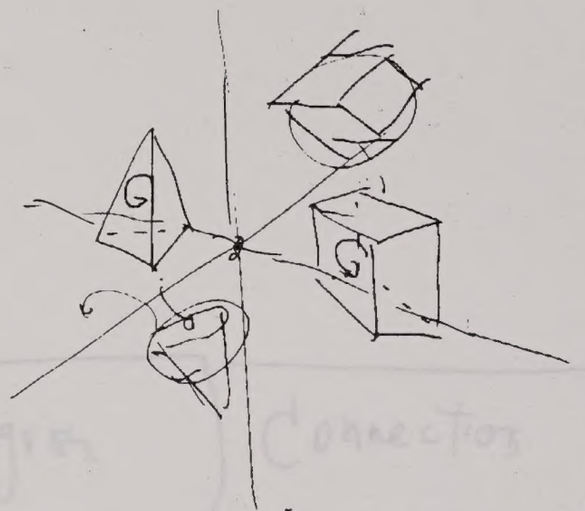
Observing Physician

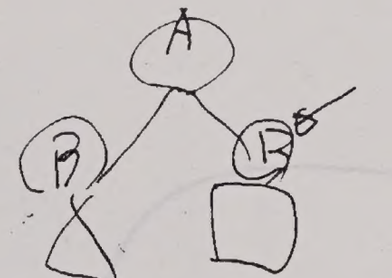
ZIGZAG CONFIDENTIAL.

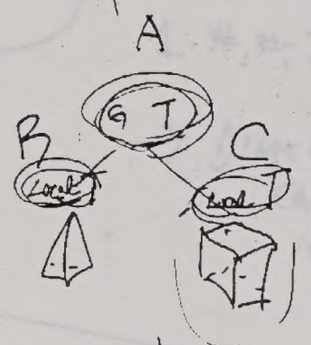
MTG MAR 2 8 1995 25

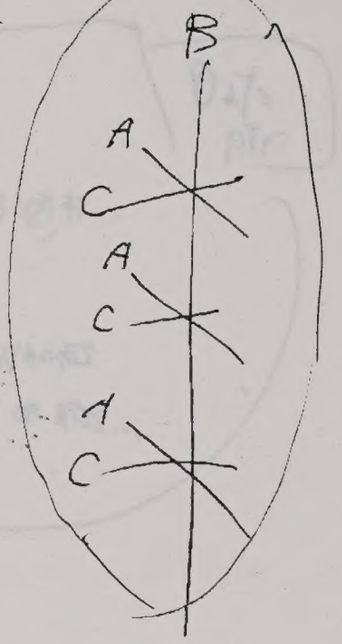
Mr. Oo discusses:

ROTATION MATRICES.





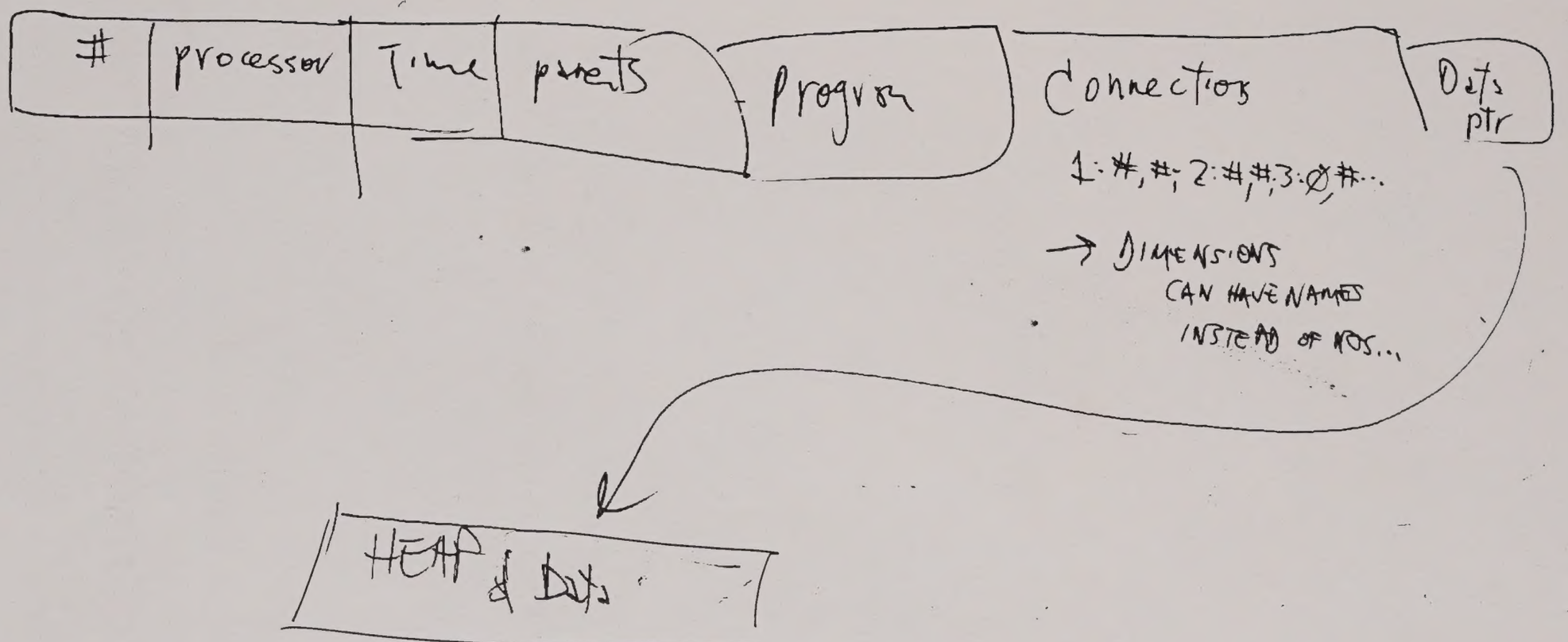




ZIGZAG CONFIDENTIAL.

MTG MAR 2 8 1995 76

CELL



Player Control
Player
Player
Player